MDS-JA50ES

SERVICE MANUAL

US Model
AEP Model
UK Model

Photo: GOLD

U.S. and foreign patents licensed from Dolby Laboratories Licensing Corporation.

Model Name Using Similar Mechanism	NEW
MD Mechanism Type	MDM-4A
Base Unit Type	MBU-2B
Optical Pick-up Type	KMS-210A/J-N

SPECIFICATIONS

System	MiniDisc digital audio system
Disc	MiniDisc
Laser	Semiconductor laser (λ = 780 nm) Emission duration: continuous
Laser output	Less than 44.6 µW* * This output is the value measured at a distance of 200 mm from the objective lens surface on the Optical Pick-up Block with 7 mm aperture.
Laser diode properties	Material: GaAlAs
Revolutions (CLV)	400 rpm to 900 rpm
Error correction	Advanced Cross Interleave Reed Solomon Code (ACIRC)
Sampling frequency	44.1 kHz
Coding	Adaptive Transform Acoustic Coding (ATRAC)
Modulation system	EFM (Eight-to-Fourteen Modulation)
Number of channels	2 stereo channels
Frequency response	5 to 20,000 Hz ±0.3 dB
Signal-to-noise ratio	Over 105 dB during playback
Wow and flutter	Below measurable limit

Inputs

	Jack type	Input impedance	Rated input	Minimum input
LINE(ANALOG) IN	Phono jacks	47 kilohms	500 mVrms	125 mVrms
DIGITAL IN COAXIAL	Phono jack	75 ohms	0.5 Vp-p, ±20%	—
DIGITAL IN OPT1	Square optical connector jack	Optical wave length: 660 nm	—	—
DIGITAL IN OPT2	Square optical connector jack	Optical wave length: 660 nm	—	—

Outputs

	Jack type	Rated output	Load impedance
PHONES	Stereo phone jack	28 mW	32 ohms
LINE(ANALOG) OUT	Phono jacks	2 Vrms (at 50 kilohms)	Over 10 kilohms
DIGITAL OUT OPTICAL	Square optical connector jack	–18 dBm	Wave length: 660 nm

MINIDISC DECK

MICROFILM

SONY®

General

Power requirements

Where purchased	Power requirements
U.S.A.	120 V AC, 60 Hz
Continental Europe	220 – 230 V AC, 50/60 Hz

Power consumption 26 W

Dimensions (approx.) (w/h/d) incl. projecting parts
430 × 125 × 375 mm
(17 × 5 × 14 7/8 in.)

Mass (approx.) 14.3 kg (31 lbs 3 oz)

Supplied accessories

- Audio connecting cords (2)
- Remote commander (remote) RM-D13M (1)
- Sony SUM-3 (NS) batteries (2)
- Operating Instructions
- Warranty card

Design and specifications are subject to change without notice.

CAUTION

Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type recommended by the equipment manufacturer.
Discard used batteries according to manufacture's instructions.

ADVARSEL!

Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandøren.

ADVARSEL

Eksplosjonsfare ved feilakting skifte av batteri.
Benytt samme batteritype eller en tilsvarende type anbefalt av apparatfabrikanten.
Brukte batterier katterier kasseres i henhold til fabrikantens

VARNIG

Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en likvärdig typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt gällande föreakrifter.

VAROITUS

Parist voi räjähtää, jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin.
Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:
Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE

The AC leakage from any exposed metal part to earth Ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microampers). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2V AC range are suitable. (See Fig. A)

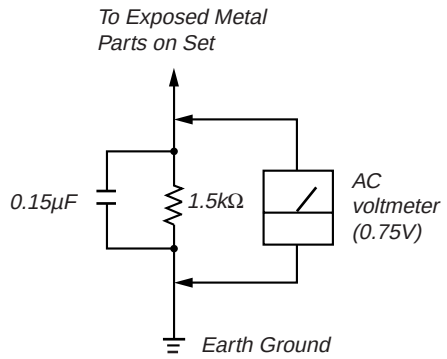


Fig. A. Using an AC voltmeter to check AC leakage.

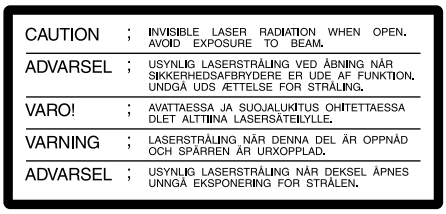
SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

The laser component in this product is capable of emitting radiation exceeding the limit for Class 1.

This appliance is classified as a CLASS 1 LASER product. The CLASS 1 LASER PRODUCT MARKING is located on the rear exterior.

The following caution label is located inside the unit.


CAUTION ; INVISIBLE LASER RADIATION WHEN OPEN. AVOID EXPOSURE TO BEAM.
ADVARSEL ; USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION. UNDGÅ UDS ÆTTELSE FOR STRÅLING.
VARO! ; AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA LASERSÄTEILYLLE.
VARNING ; LASERSTRÅLING NÄR DENNA DEL ÄR OPPNÅD OCH SPÄRREN ÄR URXOPPLAD.
ADVARSEL ; USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES UNNGÅ EKSPONERING FOR STRÅLEN.

CAUTION
Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

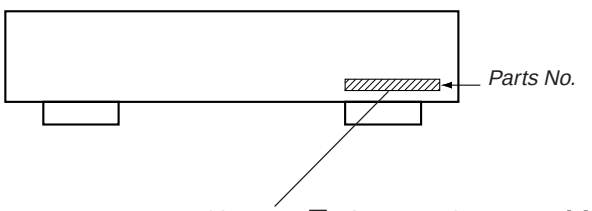
Notes on chip component replacement

- Never reuse a disconnected chip component.
- Notice that the minus side of a tantalum capacitor may be damaged by heat.

Flexible Circuit Board Repairing

- Keep the temperature of soldering iron around 270˚C during repairing.
- Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
- Be careful not to apply force on the conductor when soldering or unsoldering.

MODEL IDENTIFICATION — BACK PANEL —



4-987-511-2□ : AEP, UK, German model
4-987-511-3□ : US model

TABLE OF CONTENTS

1. SERVICING NOTE 4

2. GENERAL 7

3. DISASSEMBLY
3-1. Tray Assembly 26
3-2. Bracket (Motor) ASSY 27
3-3. Holder ASSY 27
3-4. Base Unit 28
3-5. HMOT Board and HLIM Board 28

4. TEST MODE 29

5. ELECTRICAL ADJUSTMENTS 32

6. DIAGRAMS
6-1. Brock Diagrams
• BD Section 37
• Digital Section 39
• Audio Section 41
• Power Section 43
6-2. Circuit Boards Location 44
6-3. Waveforms 45
6-4. Printed Wiring Board — BD Section — 47
6-5. Schematic Diagram — BD Section — 49
6-6. Schematic Diagram — Digital Section — 52
6-7. Printed Wiring Board — Digital Section — 55
6-8. Printed Wiring Board — MD Section — 57
6-9. Schematic Diagram — MD Section — 58
6-10. Printed Wiring Board — D Out, D Vol Section — 59
6-11. Schematic Diagram — D Out, D Vol Section — 60
6-12. Printed Wiring Board — DA Section — 61
6-13. Schematic Diagram — DA Section — 63
6-14. Printed Wiring Board — AD Section — 65
6-15. Schematic Diagram — AD Section — 67
6-16. Printed Wiring Board — Panel Section — 69
6-17. Schematic Diagram — Panal Section — 71
6-18. Printed Wiring Board — Power Section — 73
6-19. Schematic Diagram — Power Section — 75
6-20. IC Block Diagrams 77
6-21. IC Pin Functions 84

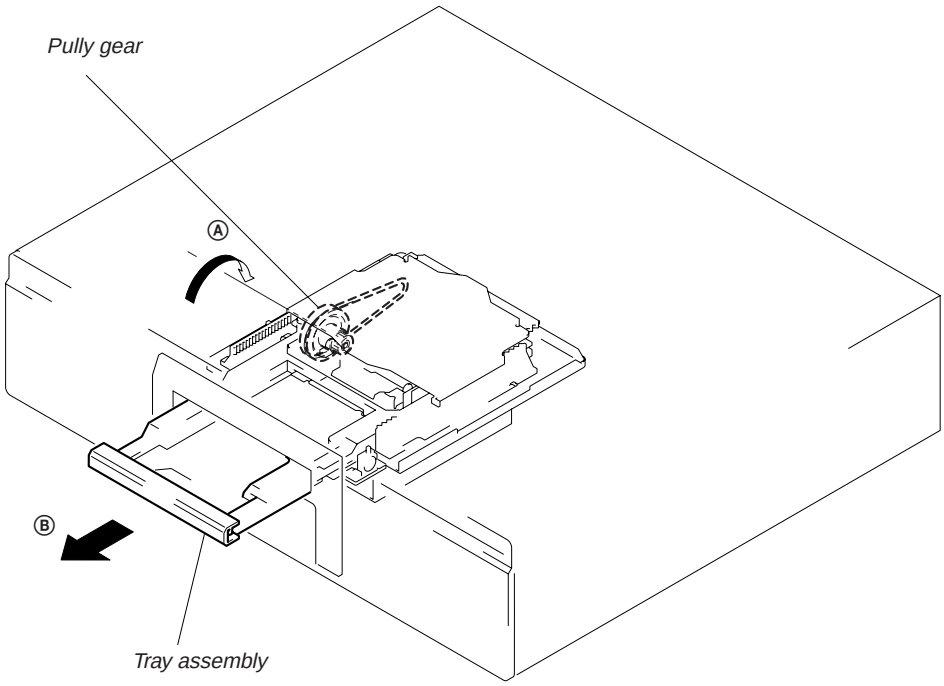
7. EXPLODED VIEWS
7-1. Main Section 100
7-2. Chassis Section 101
7-3. Front Panel Section 1 102
7-4. Front Panel Section 2 103
7-5. Mechanism Section 1 (MDM-4A) 104
7-6. Mechanism Section 2 (MDM-4A) 105
7-7. Mechanism Section 3 (MDM-4A) 106
7-8. Base Unit Section (MBU-2B) 107

8. ELECTRICAL PARTS LIST 108

SECTION 1
SERVICING NOTE

HOW TO OPEN THE DISC TRAY WHEN POWER SWITCH TURNS OFF

① Remove the fourteen screws (BVTT 3x8) from the bottom plate.
② Remove the bottom plate.
③ Rotate the pulley gear in the arrow direction Ⓐ, and open the tray assembly in the arrow direction Ⓑ.

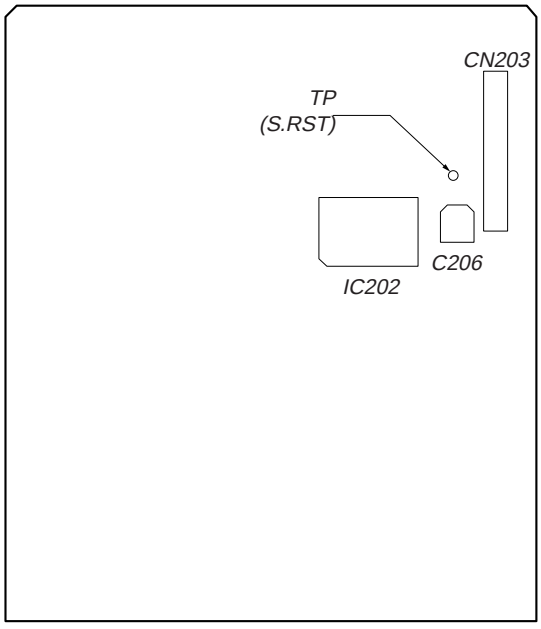


FORCED RESET

The system microprocessor can be reset in the following way.
Use these methods when the unit cannot be operated normally due to the overrunning of the microprocessor, etc.

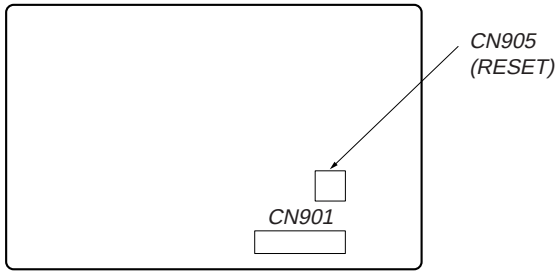
Method 1:
Set TP (S.RST) of the DIG board to ground momentarily.

[DIG board] (Side A)



Method 2:
Disconnect the power plug, and short-circuit CN905 of the PW board with a pair of tweezers, etc.

[PW board] (Component Side)



RETRY CAUSE DISPLAY MODE

- In this test mode, the causes for retry of the unit during recording can be displayed on the fluorescent display tube. This is useful for locating the faulty part of the unit.
- The retry cause, number of retries, and number of retry errors are displayed. Each is displayed in hexadecimal number.

Method:

1. Load a recordable disc whose contents can be erased into the unit.
2. Press the ■ button, ⏏OPEN/CLOSE button, DISPLAY/CHAR button simultaneously.
3. Press the ● button, and start recording.
4. The ## value increases with each retry. If an error occurs after a retry, the @@ count will also increase.
5. To exit the test mode, press the TIME button.

Fig. 1 Reading the Test Mode Display

R.T s * * c # # e @@

Fluorescent Display Tube Signs

* * : Cause of retry
: Number of retries
@@ : Number of retry errors

All three displays above are in hexadecimal numbers.

Reading the Retry Cause Display

	Higher Bits				Lower Bits				Hexa-decimal	Cause of Retry	Occurring conditions
Hexadecimal	8	4	2	1	8	4	2	1			
Bit	b7	b6	b5	b4	b3	b2	b1	b0			
Binary	0	0	0	0	0	0	0	1	01	shock *1	When more than 3.5 shocks are detected
	0	0	0	0	0	0	1	0	02	ader5	When ADER was counted more than five times continuously
	0	0	0	0	0	1	0	0	04	Discontinuous address	When ADIP address is not continuous
	0	0	0	0	1	0	0	0	08	(Not used)	(Not used)
	0	0	0	1	0	0	0	0	10	FCS incorrect	When not in focus
	0	0	1	0	0	0	0	0	20	IVR rec error	When ABCD signal level exceeds the specified range
	0	1	0	0	0	0	0	0	40	Spindle is slow	When spindle rotation is detected as slow
	1	0	0	0	0	0	0	0	80	Access fault	When access operation is not performed normally

*1 Some displays are not used depending on the microprocessor version.

Reading the Display:
Convert the hexadecimal display into binary display. If more than two causes, they will be added.

Example
When 42 is displayed:
Higher bit : 4 = 0100 ⟶ b6
Lower bit : 2 = 0010 ⟶ b1
In this case, the retry cause is combined of “spindle is slow” and “ader5”.

When A2 is displayed:
Higher bit : A = 1010 ⟶ b7+b5
Lower bit : 2 = 0010 ⟶ b1

The retry cause in this case is combined of “access fault”, “IVR rec error”, and “ader5”.

Hexadecimal ⟶ Binary Conversion Table

Hexadecimal	Binary	Hexadecimal	Binary
0	0000	8	1000
1	0001	9	1001
2	0010	A	1010
3	0011	B	1011
4	0100	C	1100
5	0101	D	1101
6	0110	E	1110
7	0111	F	1111

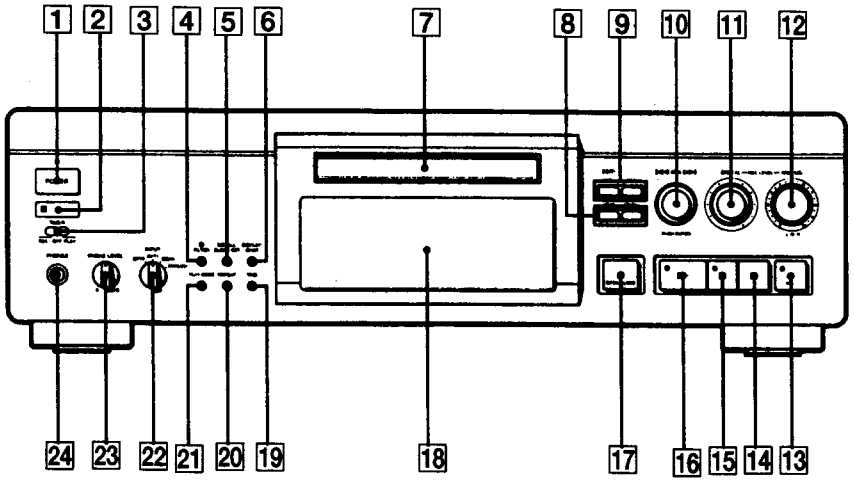
Reference:
In this test mode, when the ▷ button is pressed, and the disc is played back, the “PLAYBACK MODE” is set.
The display becomes as shown in Fig. 2. The playback mode is not used in particular during servicing.

▲▲ △△△△△△ ■

Fig. 2 Display during Playback Mode
▲ : Parts No. (Name of area named on TOC)
△△△△△△ : Address (Physical address on disc)
■ : Track mode (Copyright information of each part, information on copyright, etc.)

SECTION 2
GENERAL

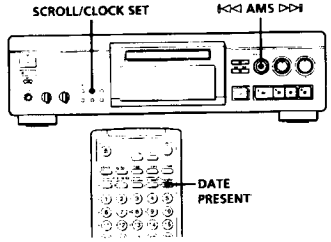
Location of Parts and Controls



1 POWER switch
2 Remote sensor
3 TIMER switch
4 FILTER button
5 SCROLL/CLOCK SET button
6 DISPLAY/CHAR button
7 Disc tray
8 ◀◀/▶▶ (fast backward/fast forward) buttons
9 EDIT/NO /YES buttons
Pressing the EDIT/NO button once, it becomes the edit menu and the recorded disc can be programmed.
Pressing it twice it becomes the set up menu (page 43), and various settings are possible.
10 AMS knob
11 DIGITAL REC LEVEL knob
12 ANALOG REC LEVEL L/R knob
13 ● REC (recording) button
14 ■ (stop) button
15 ❚❚ (pause) button
16 ▶ (play) button
17 ⏏ OPEN/CLOSE button
18 Display window
19 TIME button
20 REPEAT button
21 PLAY MODE button
22 INPUT switch
23 PHONE LEVEL knob
24 PHONES jack

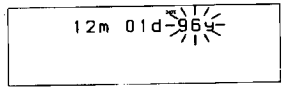
Setting the Clock

Once you set the MD deck's internal clock, the MD deck will automatically record the date and time of all recordings. When playing a track, you can display the date and time the track was recorded (see page 21). Time on this deck is displayed on a 12-hour clock (Canadian model only) or a 24-hour clock (European model only).

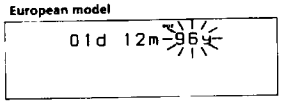


1 With the deck in standby status (the POWER indicator lights red), press SCROLL/CLOCK SET down for about 2 seconds until the year indication in the display starts flashing.

Canadian model

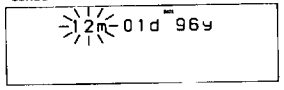


European model

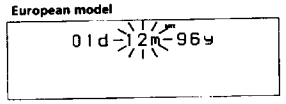


2 Turn AMS to enter the current year, then press AMS.
The year indication stops flashing, and the month indication starts flashing.

Canadian model

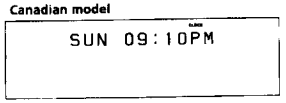


European model

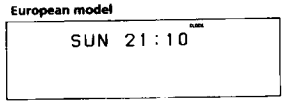


3 Repeat Step 2 to enter the month, day, hour, and minute.

Canadian model



European model



For precise time and date stamping of recordings
Reset the time at least once a week.

Note
If the AC power cord is disconnected or the MAIN POWER switch on the rear panel has been set to OFF (only on the European model) for a long time, the memorized clock settings will disappear and "STANDBY" will flash in the display the next time you plug in and turn on the deck. If this happens, reset the clock.

Displaying the current date and time

You can display the current date and time any time even when the deck is in standby status.

Press DATE PRESENT.
Each press of the button changes the display as follows:

→ Current display → Date → Time →

You can display the current date and time with an on-deck button
Press the SCROLL/CLOCK SET button. Each press of the button changes the display in the same order as the DATE PRESENT button on the remote does.

Changing the date and/or time

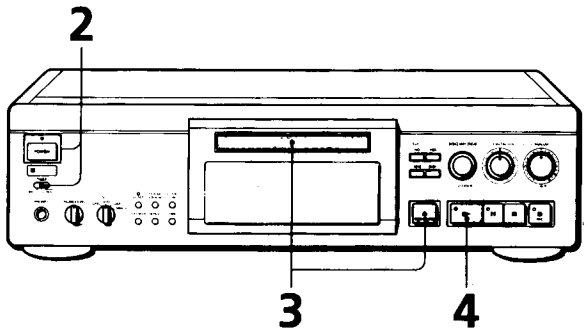
1 With the deck in standby status (the POWER indicator lights red), press SCROLL/CLOCK SET down for about 2 seconds until the year indication in the display starts flashing.

2 Press AMS repeatedly until the item you want to change flashes.

3 Turn AMS to change the contents of the selected item.

4 To complete the setting, press AMS repeatedly until all items stop flashing.

Playing an MD

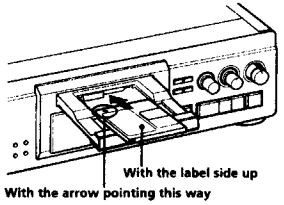


See pages 4 and 5 for hookup information.

1 Turn on the amplifier and set the source selector to the position for MD deck.

2 After confirming that TIMER is set to OFF, press POWER.
The POWER indicator changes from red to green.

3 Press ⏏ OPEN/CLOSE to open the disc tray, insert an MD, and then press the button again to close the disc tray.



4 Press ▶.
The deck starts playing. Adjust the volume on the amplifier.

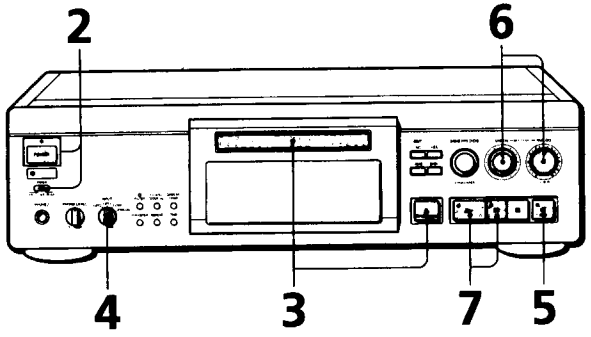
You can locate and play back a track while the deck is stopped
1 Turn AMS (or press ⏮ or ⏭) until the number of the track you want to play appears.
2 Press AMS or ▶.

To use headphones
Connect them to PHONES jack. Use PHONE LEVEL to adjust the volume.

To	Do the following:
Stop playing	Press ■.
Pause playing	Press ⏸. Press the button again or press ▶ to resume playing.
Go to the next track	Turn AMS clockwise (or press ⏭ on the remote).
Go to the preceding track	Turn AMS counterclockwise (or press ⏮ on the remote).
Take out the MD	Press ⏏ OPEN/CLOSE after stopping playing.

This section is extracted from instruction manual.

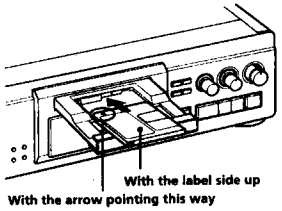
Recording on an MD



1 Turn on the amplifier and play the program source you want to record.

2 After confirming that TIMER is set to OFF, press POWER.
The POWER indicator changes from red to green.

3 Insert a recordable MD and close the disc tray.



If the MD has a recorded material on it, the deck will automatically start recording from the end of the last recorded track.

4 Set INPUT to the corresponding input connector.

To record through	Set INPUT to
LINE(ANALOG) IN	ANALOG
DIGITAL IN COAXIAL	COAX
DIGITAL IN OPT1	OPT1
DIGITAL IN OPT2	OPT2

5 Press ● REC.
The deck becomes ready to record.

6 Adjust the recording level.

When recording through the DIGITAL IN COAXIAL, OPT1, or OPT2 connector

Setting the DIGITAL REC LEVEL control at 0 is satisfactory for most purposes. For details, see page 13.

When recording through the LINE(ANALOG) IN connectors

Setting the ANALOG REC LEVEL L/R controls at 4 is satisfactory for most purposes. For details, see page 14.

7 Press ► or ❚❚.
Recording starts.

8 Start playing the program source.

Do not disconnect the deck from the power source immediately after recording

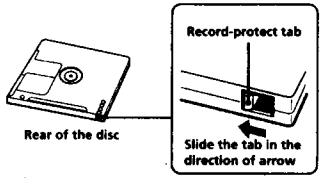
If you do, recorded material may not be saved to the MD. To save the material, after recording, press ⏏ OPEN/CLOSE to take out the MD or change the deck to standby by pressing POWER. "TOC Writing" will flash in the display at this time.
After "TOC Writing" stops flashing and goes out, you can pull out the AC power cord.

To	Press
Stop recording	■
Pause recording*	❚❚. Press the button again or press ► to resume recording.
Take out the MD	⏏ OPEN/CLOSE after stopping

* Whenever you pause recording, the track number increases by one. For example, if you paused recording while recording on track 4, the track number increases by one and recording continues on the new track when restarted.

To protect an MD against accidental erasure

To make it impossible to record on an MD, slide the tab in the direction of arrow, opening the slot. To allow recording, close the slot.



Notes on Recording

If "Protected" appears in the display
The MD is record-protected. Close the slot to record on the disc (see "To protect an MD against accidental erasure" on page 9).

If "Din Unlock" flashes in the display
- The digital program source is not connected as you set with the INPUT switch in Step 4 on page 8. To continue, connect the program source properly.
- The program source is not on. Turn on the program source.

Depending on the menu settings and source being recorded, track numbers are marked in following ways:
- When recording from a CD or MD with the INPUT switch set at COAX, OPT1, or OPT2 and the source connected through the respective DIGITAL IN connector:
  The deck automatically marks track numbers in the same sequence as the original. If, however, a track is repeated two or more times (e.g. by single-track repeat play) or two or more tracks with the same track number (e.g. from different MDs or CDs) are played, the track or tracks are recorded as part of a single, continuous track with a single track number. If the source is an MD, track numbers may not be marked for tracks of less than 4 seconds.
- When recording from a source connected through the LINE(ANALOG) IN connectors with the INPUT switch set at ANALOG or when recording from a DAT or satellite broadcast connected through one of the DIGITAL IN connectors with the INPUT switch set at the respective digital position and "T.Mark Off" selected in the S02 menu:
  The source will be recorded as a single track.
- Even while recording an analog source or a DAT or satellite broadcast, you can mark track numbers if a setting other than "T.Mark Off" is selected in the S02 menu (see "Marking Track Numbers While Recording" on page 14).
- When recording from DAT or satellite broadcasts with the INPUT switch set at the respective digital position, the deck automatically marks a track number whenever the sampling frequency of the input signal changes regardless of the S02 menu setting.

You can mark track numbers during or after recording
For details, see "Marking Track Numbers While Recording" (page 14) and "Dividing Recorded Tracks" (page 31).

You can mark track numbers at 1- or 5-minute intervals
For details, see "Marking track numbers automatically at regular intervals" (page 15).

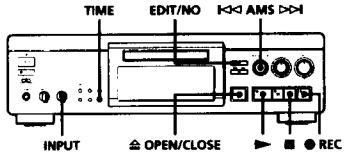
When "TOC Writing" flashes in the display
The deck is currently updating the Table Of Contents (TOC). Do not move the deck or pull out the AC power cord. Changes to an MD made through recording are saved only when you update the TOC by ejecting the MD or changing the deck to standby by pressing the POWER switch.

The MD deck uses the SCMS (Serial Copy Management System on page 40)
MDs recorded through digital input connector cannot be copied onto other MDs or DAT tapes through the digital output connector.

When recording digital signals that have been emphasized (in the higher frequencies)
The signal is automatically de-emphasized (with attenuation proportional to the degree of emphasis) and the level of the de-emphasized signal is indicated on the peak level meters.

When the deck is recording or in recording pause, digital signals input through one of the DIGITAL IN connectors are output to the DIGITAL OUT OPTICAL connector with the same sampling rate
To change the digital input signal to another sampling rate for output (without recording it to an MD), use Input Monitor Function (see page 11).

Useful Tips for Recording



Checking the remaining recordable time on the MD

Press TIME.
- When you press the TIME button while recording, the remaining recordable time on the MD appears.
- When you press the TIME button repeatedly while the deck is stopped, the display alternates between total disc playing time and remaining recordable time on the MD (see page 20).

Monitoring the input signal (Input Monitor)

Before starting recording, you can monitor the selected input signal through the deck's output connectors.

1 Press ⏏ OPEN/CLOSE to remove the MD.

2 Set INPUT according to the input signal you want to monitor.
When the INPUT switch is set at ANALOG
The analog signal input through the LINE(ANALOG) IN connectors is output to the DIGITAL OUT OPTICAL connector after A/D conversion, and then to the LINE(ANALOG) OUT connectors and the PHONES jack after D/A conversion.
When the INPUT switch is set to a digital source
After passing through the sampling rate converter, the digital signal input through the respective DIGITAL IN connector is output to the DIGITAL OUT OPTICAL connector, and after D/A conversion to the LINE(ANALOG) OUT connectors and PHONES jack. Either "32kHz", "44.1kHz", or "48kHz" appears in the display depending on the sampling rate of the digital signal.

3 Press ● REC.
If the INPUT switch is set at ANALOG, "AD-DA" appears in the display.
If the INPUT switch is set at a digital position, "-DA" appears in the display.

If "Auto Cut" appears in the display (Auto Cut)

There has been no sound input for 30 seconds during recording. The 30 seconds of silence are replaced by a blank of about 3 seconds and the deck changes to recording pause.

You can turn off the Auto Cut Function
For details, see "To turn off the Smart Space Function and Auto Cut Function" below. Note that when you turn off the Auto Cut Function, the Smart Space Function is turned off automatically.

If "Smart Space" appears in the display (Smart Space)

There has been an extended silence of 4 to 30 seconds in length during recording. The silence is replaced with a blank of about 3 seconds and the deck continues recording. Note that new track numbers may not be marked for portions recorded while this function is activated.

To turn off the Smart Space Function and Auto Cut Function
1 While the deck is stopped, press EDIT/NO twice.
2 Turn AMS to display the S08 menu, then press AMS.
3 Turn AMS to select "S.Space Off", then press AMS.
4 Press EDIT/NO.

To turn on the Smart Space Function and Auto Cut Function again
1 Do Steps 1 and 2 in "To turn off the Smart Space Function and Auto Cut Function" above.
2 Turn AMS to select "S.Space On", then press AMS.
3 Press EDIT/NO.

Notes
- When you turn off the Smart Space Function, the Auto Cut Function is also turned off automatically.
- The Smart Space Function and Auto Cut Function are factory set to on.
- The Smart Space Function does not affect the order of the track numbers being recorded, even if the blank space occurs in the middle of a track.
- If you turn off the deck or disconnect the AC power cord, the deck will recall the last setting (On or Off) of the Smart Space and Auto Cut Functions the next time you turn on the deck.

Playing back tracks just recorded

Do this procedure to immediately play back tracks that have just been recorded.

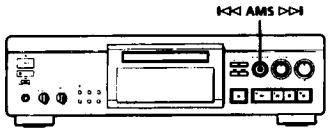
Press ► immediately after stopping recording.
Playback starts from the first track of the material just recorded.

To play from the first track of the MD after recording

1 Press ■ again after stopping recording.
2 Press ►.
Playback starts from the first track of the MD.

Recording Over Existing Tracks

Follow the procedure below to record over existing material just as you would on an analog cassette tape.



1 Do Steps 1 to 4 in "Recording on an MD" on page 8.

2 Turn AMS (or press I◄◄ or ►►I) until the number of the track to be recorded over appears.

3 To record from the start of the track, continue from Step 5 in "Recording on an MD" on page 9.

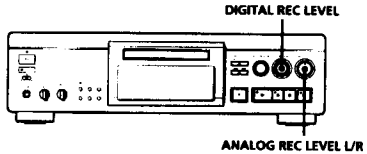
While "TR" flashes in the display
The deck is recording over an existing track, and stops flashing when it reaches the end of the recorded portion.

To record from the middle of the track
1 After Step 2 above, press ► to start playback.
2 Press II where you want to start recording.
3 Continue from Step 5 in "Recording on an MD" on page 9.

Note
You cannot record from the middle of an existing track when the "PROGRAM" or "SHUFFLE" is on.

Adjusting the Recording Level

Use the DIGITAL REC LEVEL control or the ANALOG REC LEVEL L/R controls to adjust the recording level before starting recording.

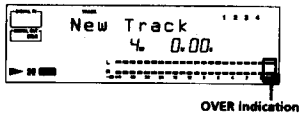


Adjusting the digital recording level

1 Do Steps 1 to 5 in "Recording on an MD" on pages 8 and 9.

2 Play the portion of the program source with the strongest signal level.

3 While monitoring the sound, turn DIGITAL REC LEVEL (or press DIGITAL REC LEVEL +/–) to adjust the recording level so that the peak level meters reach their highest point without turning on the OVER indication. Occasional lighting of "OVER" is acceptable.



4 Stop playing the program source.

5 To start recording, do the procedure starting from Step 7 in "Recording on an MD" on page 9.

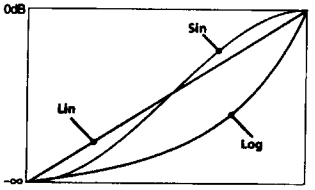
You can use the S12 menu to select the signal levels adjusted by the DIGITAL REC LEVEL control
1 While the deck is stopped, press EDIT/NO twice.
2 Turn AMS to display the S12 menu, then press AMS.
3 Turn AMS to select the levels to be adjusted by turning DIGITAL REC LEVEL.

To	Select
adjust both the recording and playback levels	DigLvl All
adjust the recording level only	DigLvl Rec
disable the DIGITAL REC LEVEL control	DigLvl Off

4 Press EDIT/NO.

You can select the type of increment/decrement curve for adjusting recording and/or playback level
1 While the deck is stopped, press EDIT/NO twice.
2 Turn AMS to display the S13 menu, then press AMS.
3 Turn AMS to select "DigLvl Lin", "DigLvl Sin", or "DigLvl Log", then press EDIT/NO.

The increment/decrement curves are shown in the graph below.
All curves become "Lin" when the signal level goes beyond 0 dB.



The No Clip Function can be used to decrease the recording level gradually when a signal of excessively high level is input during digital recording

To turn on the No Clip Function by menu setting
1 While the deck is stopped, press EDIT/NO twice.
2 Turn AMS to display the S09 menu, then press AMS.
3 Turn AMS to select "No Clip On", then press EDIT/NO.

To turn on the No Clip Function using the remote
Press NO CLIP to display "No Clip On."

(Continued)

The Peak Hold Function freezes the level meter display at the highest level reached by the input signal

To turn on the Peak Hold Function by menu setting

1 While the deck is stopped, press EDIT/NO twice.
2 Turn AMS to display the S10 menu, then press AMS.
3 Turn AMS to select "P.Hold On", then press EDIT/NO.

To turn on the Peak Hold Function using the remote

Press P.HOLD to display "P.Hold On."

Adjusting the analog recording level

1 Do Steps 1 to 5 in "Recording on an MD" on pages 8 and 9.

2 Play the portion of the program source with the strongest signal level.

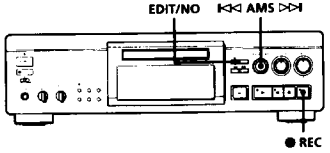
3 While monitoring the sound, turn ANALOG REC LEVEL L and R.

4 Stop playing the program source.

5 To start recording, do the procedure starting from Step 7 in "Recording on an MD" on page 9.

Marking Track Numbers While Recording (Track Marking)

You can mark track numbers either manually or automatically. By marking track numbers at specific points, you can quickly locate the points later using the AMS Function, or use various Editing Functions.



Marking track numbers manually (Manual Track Marking)

You can mark track numbers at any time while recording on an MD.

Press ● REC at the place you want to add a track mark while recording.

Marking track numbers automatically (Automatic Track Marking)

The deck adds track marks differently in the following cases:

- When recording from CDs or MDs with the INPUT switch set at a digital source:
  The deck marks track numbers automatically.
- In all other cases:
  If "T.Mark LSyn" is selected in the S02 menu, the deck marks a new track number whenever the signal drops to the specified level or below for a specified amount of time or longer, then rises to a specified level. To select "T.Mark Off" or "T.Mark LSyn" in the S02 menu, do the procedure below:

1 While the deck is stopped, press EDIT/NO twice.

2 Turn AMS to display the S02 menu, then press AMS.

3 Turn AMS to select "T.Mark Off" or "T.Mark LSyn", then press AMS.
"L.SYNC" lights up when you select "T.Mark LSyn."

4 Press EDIT/NO.

You can set the reference level and duration that must pass before a rise triggers a new track mark

In Automatic Track Marking, the input signal must remain at or below a given reference level for a given duration before a rise above the reference level will trigger a new track marking. Do the following procedure to specify the reference level and duration.

1 While the deck is stopped, press EDIT/NO twice.
2 **To set the reference level:**
Turn AMS to display the S03 menu, then press AMS.
To set the duration:
Turn AMS to display the S04 menu, then press AMS.
3 Turn AMS to set the reference level or duration.
You can set the reference level at -72 dB to 0 dB in 2 dB steps and the duration at 0 second to 9.5 seconds in 0.5 second steps.
4 After selecting the reference level or duration, press AMS.
5 Press EDIT/NO.

Marking track numbers automatically at regular intervals

The deck can mark track numbers automatically at regular intervals of 1 or 5 minutes. This is useful when recording from an analog record, satellites broadcast, or FM broadcast for locating tracks afterwards since the track numbers show the elapsed recording time (i.e., playing time).

1 While the deck is stopped, press EDIT/NO twice.

2 Turn AMS to display the S02 menu, then press AMS.

3 Turn AMS to select "T.Mark 1min" or "T.Mark 5min", then press AMS.

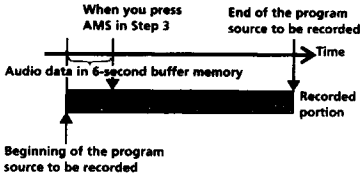
4 Press EDIT/NO.

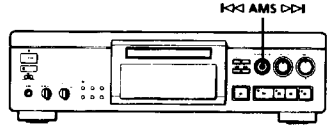
Note

If you turn off the deck or disconnect the AC power cord, the deck will recall the last settings of the Automatic Track Marking Function the next time you turn on the deck.

Starting Recording With 6 Seconds of Prestored Audio Data (Time Machine Recording)

When recording from an FM or satellite broadcast, the first few seconds of material are often lost due to the time it takes you to ascertain the contents and press the record button. To prevent the loss of this material, the Time Machine Recording Function constantly stores 6 seconds of the most recent audio data in a buffer memory so that when you begin recording the program source using this function, the recording actually begins with the 6 seconds of audio data stored in the buffer memory in advance as shown in the illustration below.


When you press AMS in Step 3
End of the program source to be recorded
Time
Audio data in 6-second buffer memory
Recorded portion
Beginning of the program source to be recorded



1 Do Steps 1 to 5 in "Recording on an MD" on pages 8 and 9.
The deck changes to recording pause.

2 Start playing the program source you want to record.
The most recent 6 seconds of audio data is stored in the buffer memory.

3 Press AMS (or T.REC) to start Time Machine Recording.
Recording of the program source starts with the 6 seconds of audio data stored in the buffer memory.

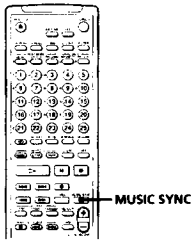
(Continued)

To stop Time Machine Recording
Press ■.

Note
The deck starts storing audio data when the deck is in recording pause and you start playing the program source. With less than 6 seconds of playing of the program source and audio data stored in the buffer memory, Time Machine Recording starts with less than 6 seconds of audio data.

Synchro-Recording With Audio Equipment of Your Choice (Music Synchro-Recording)

By using the MUSIC SYNC button on the remote, you can automatically start recording in sync with the signal input from the program source.
The method of marking track numbers differs, depending on the program source being recorded and the setting of the S02 menu (see "Notes on Recording" on page 10).



1 Do Steps 1 to 4 in "Recording on an MD" on page 8.

2 Press MUSIC SYNC.
The deck changes to recording pause.

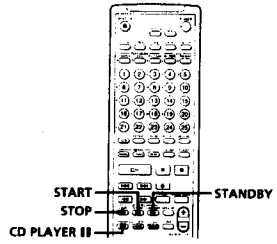
3 Start playing the program source you want to record.
The deck starts recording automatically.

To stop Music Synchro-Recording
Press ■.

Note
When Music Synchro-Recording, the Smart Space Function and the Auto Cut Function turn on automatically regardless of their setting (On or Off) and type of input (digital or analog).

Synchro-Recording With a Sony CD Player

By connecting your deck to a Sony CD player or Hi-Fi Component System, you can easily dub CDs onto MDs using the CD synchro buttons on the remote. If your deck is connected to a Sony CD player by a digital input cable, track numbers are automatically marked as appear on the original even when "T.Mark Off" is selected in the S02 menu. If your deck is connected to a Sony CD player by audio connecting cords through the LINE(ANALOG) IN connectors, track numbers are automatically marked when you set the S02 menu to "T.Mark LSyn" (see page 14).
As the same remote controls both the CD player and the deck, you may have trouble operating both units if they are far from each other. If you do, place the CD player close to this deck.



1 Set the source selector on the amplifier to CD.

2 Do Steps 2 to 4 in "Recording on an MD" on page 8 to prepare the deck for recording.

3 Insert a CD into the CD player.

4 Select the playback mode (Shuffle Play, Program Play, etc.) on the CD player.

5 Press STANDBY.
The CD player pauses for playing and the deck pauses for recording.

6 Press START.
The deck starts recording and the CD player starts playback.
The track number and elapsed recording time of the track appear in the display.

If the CD player does not start playing
Some CD player models may not respond when you press START on the remote of the deck. Press II on the remote of the CD player instead.

7 Press STOP to stop synchro-recording.

To pause recording
Press STANDBY or CD PLAYER II.
To restart recording, press START or CD PLAYER II.
A new track number is marked each time you pause recording.

You can use the remote of the CD player during synchro-recording
When you press ■, the CD player stops and the deck pauses for recording.
When you press II, the CD player pauses and the deck pauses for recording.
To restart synchro-recording, press ▷.

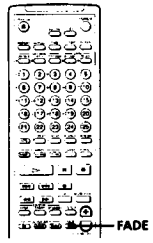
You can change CDs during synchro-recording
Do the following steps instead of Step 7 above.
1 Press ■ on the remote of the CD player.
The deck pauses for recording.
2 Change the CD.
3 Press ▷ on the remote of the CD player.
Synchro-recording restarts.

You can also do synchro-recording with a Sony video CD player
Using the procedure for synchro-recording with a Sony CD player, you can do synchro-recording with a Sony video CD player also.
To select the video CD player, press button number 2 while pressing down the POWER button on the remote before starting the procedure.
To select the CD player again, press button number 1 while pressing down the POWER button.
The deck is factory set to a CD player for synchro-recording.

You can check the remaining recordable time on the MD
Press TIME (see page 20).

Fading In and Out (Fader)

You can gradually increase the recording level at the beginning of a recording (fade in) or gradually decrease the recording level at the end of a recording (fade out).
This function is convenient when, for example, you don't want the track cut off abruptly when the disc reaches to its end.



Fade-in recording

During recording pause, press FADE at the position where you want to start fade-in recording.
"FADE IN" flashes in the display and the deck performs the fade-in recording until the counter reaches "0.0s."

Fade-out recording

During recording, press FADE at the position where you want to start fade-out recording.
"FADE OUT" flashes in the display and the deck performs the fade-out recording until the counter reaches "0.0s."
The deck changes to recording pause when fade-out recording finishes.

You can set the duration of fade-in and fade-out recording independently

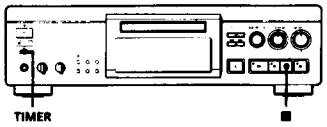
1 While the deck is stopped, press EDIT/NO twice.
2 **To set the duration of fade-in recording:**
Turn AMS to display the S14 menu, then press AMS.
To set the duration of fade-out recording:
Turn AMS to display the S15 menu, then press AMS.
3 Turn AMS to set the duration.
Both the fade-in and fade-out recording durations can be set within the following range:
1.0 to 3.0 seconds (in 0.2 second steps)
3.0 to 5.0 seconds (in 0.4 second steps)
5.0 to 15.0 seconds (in 1 second steps)
4 After selecting the duration, press AMS.
5 Press EDIT/NO.

You can select the type of increment/decrement curve for fade-in/fade-out recording

1 While the deck is stopped, press EDIT/NO twice.
2 **To select the curve for fade-in recording:**
Turn AMS to display the S16 menu, then press AMS.
To select the curve for fade-out recording:
Turn AMS to display the S17 menu, then press AMS.
3 Turn AMS to select "FadeIn (Out) Lin", "FadeIn (Out) Sin", or "FadeIn (Out) Log", then press AMS.
4 Press EDIT/NO.

Recording on an MD Using a Timer

By connecting a timer (not supplied) to the deck, you can start and stop recording operations at specified times. For further information on connecting the timer and setting the starting and ending times, refer to the instructions that came with the timer.



1 Do Steps 1 to 6 in "Recording on an MD" on pages 8 and 9.

2
- If you want to specify the time for the start of recording, press ■.
- If you want to specify the time for the end of recording, do Steps 7 and 8 of "Recording on an MD" on page 9.
- If you want to specify the time for both start and end of recording, press ■.

3 Set TIMER on the deck to REC.

4 Set the timer as required.
- When you have set the time for the start of recording, the deck turns off. When the specified time arrives, the deck turns on and starts recording.
- When you have set the time for the end of recording, recording continues. When the specified time arrives, the deck stops recording and turns off.
- When you have set the time for both the start and end of recording, the deck turns off. When the starting time arrives, the deck turns on and starts recording. When the ending time arrives, the deck stops recording and turns off.

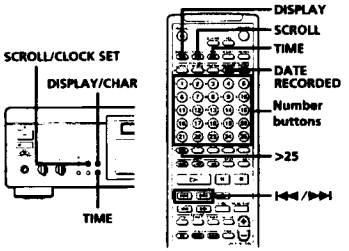
5 After you have finished using the timer, set TIMER on the deck to OFF. Then place the deck in standby status by plugging the AC power cord of the deck into a wall outlet or set the timer to continuous operation.
- If TIMER is left at REC, the deck will automatically start recording the next time you turn the deck on.
- If you do not change the deck to standby status for more than a month after timer recording has finished, the recorded contents may disappear.

Make sure to change the deck to standby status within a week after timer recording is completed
The TOC on the MD is updated and recorded contents are written to the MD when you turn the deck on. If the recorded contents have disappeared, "Standby" flashes when you turn the deck on.

Notes
- During timer recording, new material is recorded from the end of the recorded portion on the MD.
- Material recorded during timer recording will be saved to the disc the next time you turn the deck on. "TOC" will flash in the display at that time. Do not move the deck or pull out the AC power cord while "TOC" is flashing.
- Timer recording will stop if the disc becomes full.
- Set the digital recording level for timer recording using the DIGITAL REC LEVEL control on the deck. If you set the recording level using the DIGITAL REC LEVEL +/- buttons on the remote, the digital timer recording will be performed at the level set by the DIGITAL REC LEVEL control.

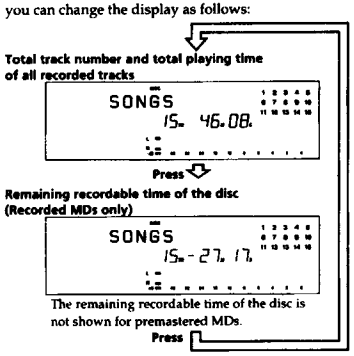
Using the Display

You can use the display to check disc and track information such as the total track number, total playing time of the tracks, remaining recordable time of the disc, disc name, and the date when a track was recorded.

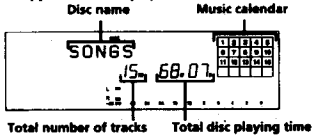


Checking the total track number, total disc playing time, remaining recordable time of the disc

Each time you press TIME while the deck is stopped, you can change the display as follows:


Total track number and total playing time of all recorded tracks
SONGS
15 46.08
Press
Remaining recordable time of the disc (Recorded MDs only)
SONGS
15 -27.17
The remaining recordable time of the disc is not shown for premastered MDs.
Press

When you insert an MD, the disc name, total number of tracks, total disc playing time, and the music calender appear in the display as follows:

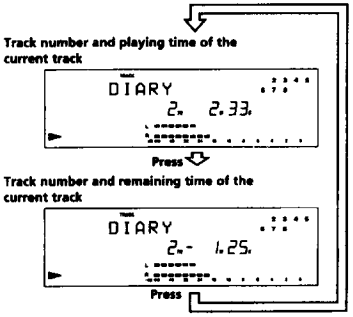


A music calendar shows all the track numbers within a grid if the MD is a premastered disc, or without a grid if the MD is a recordable disc.
If the total track number exceeds 20, ▶ appears to the right of number 20 in the music calendar.

Note
When you insert a new MD or turn off the deck and turn it on again, the last item displayed will reappear.

Checking the playing time, remaining time, and track number

Each time you press TIME while playing an MD, you can change the display as shown below. The track numbers in the music calendar disappear after they are played.



The track name and disc name are displayed as follows
The disc name appears whenever the deck is stopped, and the name of the current track appears when the track is playing. If no title is recorded, "No Name" appears instead of a title.

You can scroll a title of more than 12 characters
Press SCROLL/CLOCK SET (or SCROLL).
Since the display shows up to 11 characters at a time, press SCROLL again to see the rest of the title if the title has 12 characters or more.
Press SCROLL again to pause scrolling, and again to continue scrolling.

Displaying the recording date T

When the internal clock has been set, the deck automatically records the recording date and time of all recordings. You can then check the recording date and time of a track.

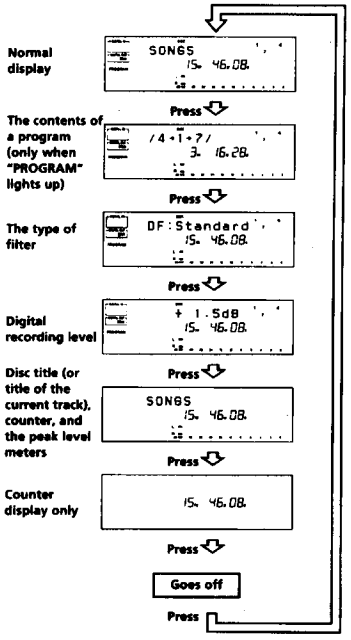
1 Locate the track for which you want to check the recording date and time.

When the deck is	Press
stopped	⏮ or ⏭
playing or on play pause	⏮, ⏭, or number buttons

2 Press DATE RECORDED.
"No Date" appears if the internal clock has not been set or the track was recorded on another MD deck without a date and time stamp function.

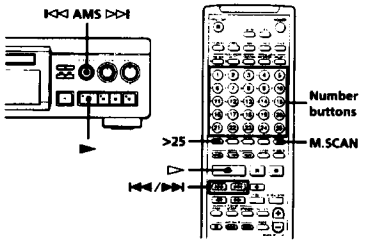
Changing the display

Each time you press DISPLAY/CHAR (or DISPLAY) while the deck is stopped or playing, you can change the display as follows:



Locating a Specific Track

You can quickly locate any track while playing a disc by using the AMS (Automatic Music Sensor) control, ⏮⏮ and ⏭⏭ buttons, number buttons, or M.SCAN button on the remote.



To locate	Do the following:
The next or succeeding tracks	During playback, turn AMS clockwise or press ⏭⏭ repeatedly until you find the track.
The current or preceding tracks	During playback, turn AMS counterclockwise or press ⏮⏮ repeatedly until you find the track.
A specific track directly T	Press number buttons to enter the track number.
A specific track by using AMS	1 Turn AMS until the track number you want to locate appears while the deck is stopped. (The track number is flashing.) 2 Press AMS or ▶.
By scanning each track for 6 seconds (music scan) T	1 Press M.SCAN before you start playing. 2 When you find the track you want, press ▷ to start playing.

When you directly locate a track with a number over 25 T
You must press >25 first, before entering the corresponding digits.
Press >25 once if it is a 2-digit track number, and twice if it is a 3-digit track number.
To enter "0," press button 10.
Examples: • To play track number 30
Press >25 once, then 3 and 10.
• To play track number 100
Press >25 twice, then 1, 10 and 10.

(Continued)

You can extend the playing time during music scan

1 While the deck is stopped, press EDIT/NO twice.
2 Turn AMS to display the S11 menu and press AMS.
3 Turn AMS to select the playing time within a range of 6 to 20 seconds (in 1 second steps) and press AMS.
4 Press EDIT/NO.

To pause playing at the beginning of a track

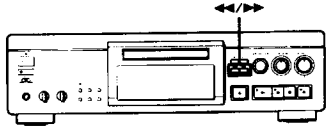
Turn AMS (or press ⏮ or ⏭) after pausing playback.

To go quickly to the beginning of the last track

Turn AMS counterclockwise (or press ⏮) while the display shows the total track number, total disc playing time or remaining recordable time of the disc (recordable disc only), or disc name (see page 20).

Locating a Particular Point in a Track

You can also use the ◀◀ and ▶▶ buttons to locate a particular point in a track during playback or playback pause.



To locate a point	Press
While monitoring the sound	▶▶ (forward) or ◀◀ (backward) and keep pressing until you find the point.
Quickly by observing the display during playback pause	▶▶ or ◀◀ and keep pressing until you find the point. There is no sound output during this operation.

If "—Over—" appears while you are pressing ▶▶ during playback pause

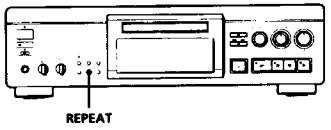
The disc has reached to its end. Press ◀◀ (or ⏮) or turn AMS counterclockwise to go back.

Notes

- If the disc reaches the end while you are pressing ▶▶ during sound monitoring, the deck stops.
- Tracks that are only a few seconds long may be too short to scan using the search function. For such tracks, it is better to play the MD at normal speed.

Playing Tracks Repeatedly

You can play tracks repeatedly in any play mode.



Press REPEAT.
"REPEAT" appears in the display.
The deck repeats the tracks as follows:

When the MD is played in	The deck repeats
Normal play (page 7)	All the tracks
Shuffle Play (page 23)	All the tracks in random order
Program Play (page 24)	The same program

To cancel repeat play

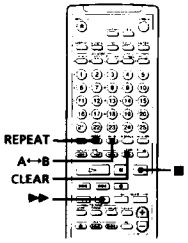
Press REPEAT several times (or CONTINUE once) until "REPEAT" disappears.
The deck returns to the original playing mode.

Repeating the current track

While the track you want to repeat is playing in normal, Shuffle, or Program Play, press REPEAT several times until "REPEAT 1" appears in the display.

Repeating a specific portion (A-B Repeat)

You can play a specific portion of a track repeatedly. This might be useful when you want to memorize lyrics.
Note that you can only repeat a portion within the boundaries of a single track.



1 While playing a disc, press A↔B at the starting point (point A) of the portion to be played repeatedly.
"REPEAT A-" appears and "B" flashes in the display.

2 Continue playing the track or press ▶▶ until you reach the ending point (point B), then press A↔B again.
"REPEAT A-B" lights continuously. The deck starts to play the specified portion repeatedly.

To cancel A-B Repeat

Press REPEAT, CLEAR, or ■.

Setting new starting and ending points

You can repeat the portion immediately after the currently specified portion by changing the starting and ending points.

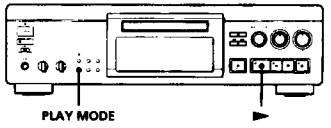
1 Press A↔B while "REPEAT A-B" appears.
The current ending point B becomes the new starting point A, "REPEAT A-" lights continuously, and "B" flashes in the display.
2 Continue playing the track or press ▶▶ until you reach the new ending point (point B), then press A↔B again.
"REPEAT A-B" lights continuously and the deck starts playing repeatedly the newly specified portion.

Note

If you turn off the deck or disconnect the AC power cord, the deck will recall the last setting of the Repeat Function the next time you turn on the deck.
The A-B Repeat settings, however, are lost.

Playing in Random Order (Shuffle Play)

You can have the deck "shuffle" tracks and play them in random order.



1 Press PLAY MODE repeatedly (or SHUFFLE once) until "SHUFFLE" appears in the display when the deck is stopped.

2 Press ► to start Shuffle Play.
"🔀" appears in the display while the deck is "shuffling" the tracks.

To cancel Shuffle Play

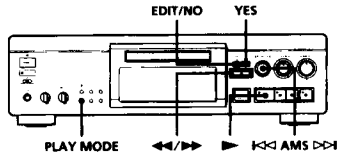
Press PLAY MODE repeatedly (or CONTINUE once) until "SHUFFLE" disappears.

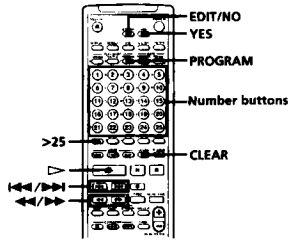
You can specify tracks during Shuffle Play

- To play the next track, turn AMS clockwise (or press ⏭).
- To play from the beginning of the current track again, turn AMS counterclockwise (or press ⏮). You cannot use AMS (or ⏮) to go to tracks that have already been played.

Creating Your Own Program (Program Play)

You can specify the playback order of the tracks on an MD and create your own programs containing up to 25 tracks.





1 While the deck is stopped, press EDIT/NO twice.

2 Turn AMS to select the S01 menu and display "Program ?", then press AMS.

3 Do either a) or b):

a) When using the controls on the deck

1 Turn AMS until the track number you want appears in the display.

2 Press AMS.

If you enter the wrong track number

Press ◀◀ or ▶▶ until the wrong track number flashes, turn AMS to set the correct track number, then press AMS.

b) When using the remote

Press the number buttons to enter the tracks you want to program in the order you want. To program a track with a number over 25, use the >25 button (see page 21).

If you enter the wrong track number

Press ◀◀ or ▶▶ until the wrong track number flashes, then enter the correct track number with the number buttons.

4 Repeat Step 3 to enter other tracks.
Each time you enter a track, the total program time is added up and appears in the display.

5 After finishing programming, press YES.
"Complete!!" appears and programming is completed.

6 Press PLAY MODE repeatedly (or PROGRAM once) until "PROGRAM" appears in the display.

7 Press ▶ to start Program Play.

To cancel Program Play

Press PLAY MODE repeatedly (or CONTINUE once) when the deck is stopped until "PROGRAM" disappears.

The program remains even after Program Play ends

When you press ▶, you can play the same program again.

Note

The display shows "- -m - -s" instead of the total playing time when the total playing time of the program exceeds 199 minutes.

Checking the track order

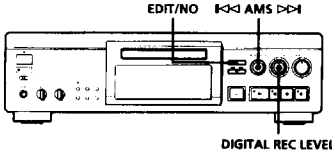
Turn AMS (or press ⏮ or ⏭) during playback or playback pause. The track numbers appear in the order they were programmed.

Changing the track order

You can change the order of the tracks in your program before you start playing.

To	Do the following:
Erase a track in the program	1 After Steps 1 and 2 on the previous page, press ▶▶ until the track number you want to erase flashes. 2 Press EDIT/NO or CLEAR.
Add tracks to the end of the program	1 After Steps 1 and 2 on the previous page, press ▶▶ until the last track number flashes. 2 Press ▶▶ again and do Steps 3 to 5 on the previous page.
Change the whole program completely	1 After Steps 1 and 2 on the previous page, hold down EDIT/NO or CLEAR until all programmed track numbers disappear. 2 Do Steps 1 to 5 on the previous page.

Useful Tips When Recording From MDs to Tape



Inserting blank spaces while recording to tape (Auto Space)

The Auto Space Function inserts a 3-second blank space between each track while recording from MDs to tapes, allowing you to use the AMS function during later playback.

1 While the deck is stopped, press EDIT/NO twice.

2 Turn AMS to display the S07 menu, then press AMS.

3 Turn AMS to select "Auto Space", then press AMS.

4 Press EDIT/NO.

You can turn on the Auto Space Function using the remote

While the deck is stopped, press A.SPACE repeatedly until "Auto Space" appears in the display.

To cancel Auto Space

Cancelling the function through menu operation on the deck

1 Do Steps 1 and 2 of "Inserting blank spaces while recording to tape" on this page.

2 Turn AMS to select "Auto Off", then press AMS.

3 Press EDIT/NO.

Cancelling the function using the remote

While the deck is stopped, press A.SPACE repeatedly until "Auto Off" appears.

Note

If the Auto Space Function is on while recording a selection containing multiple track numbers, (for example, a medley or symphony), blank spaces will be inserted within the selection whenever the track number changes.

Pausing after each track (Auto Pause)

When the Auto Pause Function is on, the deck pauses after playing each track. Auto Pause is convenient when recording single tracks or multiple, nonconsecutive tracks.

Select "Auto Pause" instead of "Auto Space" in Step 3 on "Inserting blank spaces while recording to tape" on this page.

You can turn on the Auto Pause Function using the remote

While the deck is stopped, press A.SPACE repeatedly until "Auto Pause" appears in the display.

To restart playback

Press ▶ or ⏸.

To cancel Auto Pause

Cancelling the function through a menu operation on the deck

Do Steps 1 to 3 of "To cancel Auto Space" on this page.

Cancelling the function using the remote

While the deck is stopped, press A.SPACE repeatedly until "Auto Off" appears.

Note

If you turn off the deck or disconnect the AC power cord, the deck will recall the last setting of the Auto Space and Auto Pause Functions the next time you turn on the deck.

Changing the bit length of the digital output signals

By changing the bit length, you can improve the sound quality of the signal output from the DIGITAL OUT OPTICAL connector to an MD deck or a 20-bit format DA converter.

1 While the deck is stopped, press EDIT/NO twice.

2 Turn AMS to display the S06 menu, then press AMS.

3 Turn AMS to select "Dout 20bit", then press AMS.

4 Press EDIT/NO.

Notes

- This function affects only digital signal output from the DIGITAL OUT OPTICAL connector.
- A momentary sound dropout occurs when the bit length setting is changed during playback or recording.

Adjusting the analog signal level

You can adjust the level of an analog signal for output to an amplifier connected through the LINE(ANALOG) OUT connectors.

1 While the deck is stopped, press EDIT/NO twice.

2 Turn AMS to display the S12 menu, then press AMS.

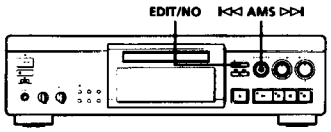
3 Turn AMS to select "DigLvl All", then press AMS.

4 Press EDIT/NO.

5 Turn DIGITAL REC LEVEL (or DIGITAL REC LEVEL +/–) to adjust the analog output level. The maximum level is output when you set the control to 0. Turning the control function in the + direction does not result in a further increase in output level.

Starting Playback From a Specific Position the Next Time You Start Playback (Resume Play)

You can specify the start of playback from the position where playback was last stopped or the deck was turned off, or from next track after that position.



1 While the deck is stopped, press EDIT/NO twice.

2 Turn AMS to display the S05 menu, then press AMS.

3 Set the position where you want playback to start the next time you start playback.

To start playback where you last stopped playback
Turn AMS to select "Resume Play", then press AMS.

To start playback from the track after the position where you stopped playback
Turn AMS to select "Resume Next", then press AMS.

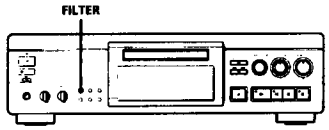
4 Press EDIT/NO.
After you stop playback or turn the deck off and press the ► button to start playback again, playback starts from the position you set in Step 3 above.

To turn off the Resume Play Function
1 Do Steps 1 and 2 above.
2 Turn AMS to select "Resume Off", then press AMS.
3 Press EDIT/NO.

Playing Back With Different Tones (Digital Filter)

This deck is equipped with the V.C. (Variable Coefficient) filters to allow you adjust the tone to match your audio system, listening environment, and the source being played back.

Note
The digital filters are effective only on the analog signals output from the LINE(ANALOG) OUT connectors and the PHONES connector.



1 Press FILTER.
The currently selected filter appears in the display.

2 Press FILTER repeatedly to select the filter that you want.
Each press of the button changes the filter as follows:

→ DF:Standard → DF:Spline → DF:Analog → DF:Plane →

You can select the filter using the remote
Press FILTER repeatedly until the filter that you want appears in the display.

What is a V.C. (Variable Coefficient) filter?
A variable coefficient filter changes the sound characteristics of a signal by applying specific frequency cut-off conditions. Such filters are provided on digital devices such as CD players and MD decks to remove aliasing noise. Your deck comes with four types of digital filters: standard, spline, plane, and analog. A brief description is given below of the sound characteristics of each filter.

Standard
This filter produces an expansive sound of wide range.

Spline
This filter produces a sound that is clearly positioned and smooth.

Plane
This filter produces a fresh and powerful sound.

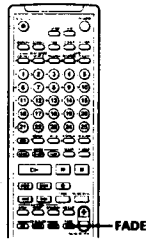
Analog
This filter produces a resonant and mellow sound.

Notes

- A momentary sound dropout occurs when the filter setting is changed during playback or recording.
- The change in sound characteristics caused by digital filters occur mainly in the inaudible range, not the audible range as in the case of an amplifier.

Fading In and Out (Fader)

You can gradually increase the playback level of the signal output from the LINE(ANALOG) IN/OUT connectors and the PHONES connector at the beginning of a playback (fade in) or gradually decrease the playback level at the end of a playback (fade out). This function is convenient when, for example, you want to start or end playback in the middle of the track.



Fade-in playback

During playback pause, press FADE at the position where you want fade-in playback to start.
"FADE IN" flashes in the display and the deck performs fade-in playback until the counter reaches to "0.0s."

Fade-out playback

During playback, press FADE at the position where you want fade-out playback to start.
"FADE OUT" flashes in the display and the deck performs fade-out recording until the counter reaches "0.0s."
The deck changes to play pause when fade-out playback finishes.

Note on the peak level meters display during fade-in/fade-out playback

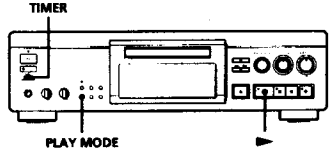
The peak level meters show the level of the original signal (input from the LINE(ANALOG) IN connectors or output to the LINE(ANALOG) OUT connectors and the PHONES connector). Therefore, the level shown on the meters does not increase or decrease ever as the output fades in or out.

You can set the duration of fade-in and fade-out playback independently
Do Steps 1 to 5 in "You can set the duration of the fade-in and fade-out recording independently" on page 18.

You can select the type of increment/decrement curve for fade-in/fade-out recording
Do Steps 1 to 4 in "You can select the type of increment/decrement curve for fade-in/fade-out recording" on page 18.

Playing an MD Using a Timer

By connecting a timer (not supplied) to the deck, you can start and stop playback operations at specified times. For further information on connecting the timer or setting the starting and ending times, refer to the instructions that came with the timer.



1 Do Steps 1 to 3 in "Playing an MD" on page 7.

2 Press PLAY MODE repeatedly (or one of the PLAY MODE buttons once) to select the play mode you want.
To play only specific tracks, create a program (see page 24).

3
- If you want to specify the time for the start of playback, go to Step 4.
- If you want to specify the time for the end of playback, press ► to start playback, then go to Step 4.
- If you want to specify the time for both start and end of playback, go to Step 4.

4 Set TIMER on the deck to PLAY.

5 Set the timer as required.
- When you have set the time for the start of playback, the deck turns off. When the specified time arrives, the deck turns on and starts playing.
- When you have set the time for the end of playback, playback continues. When the specified time arrives, the deck stops playing and turns off.
- When you have set the time for both the start and end of playback, the deck turns off. When the starting time arrives, the deck turns on and starts playing. When the ending time arrives, the deck stops playing and turns off.

6 After you have finished using the timer, set TIMER on the deck to OFF.

Note

You can select Program Play in Step 2. Note, however, that programs eventually fade away when the standby status is off, and therefore if you set the time too far in the future, the program may be gone when the specified time arrives. If this has occurred, the deck enters normal play mode at the specified time and the tracks play in consecutive order.

Notes on Editing

You can edit the recorded tracks after recording, using the following functions:
- Erase Function allows you to erase recorded tracks simply by specifying the corresponding track number.
- A-B Erase Function allows you to specify a portion within a track to erase it.
- Divide Function allows you to divide tracks at specified points so that you can quickly locate those points afterwards, using the AMS function.
- Combine Function allows you to combine two consecutive tracks into one.
- Move Function allows you to change the order of tracks by moving a specific track to a track position you want.
- Title Function allows you to create titles for your recorded MDs and tracks.

If "Protected" appears in the display

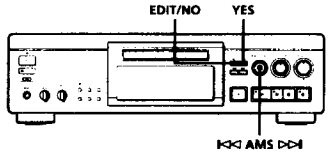
The deck could not edit because the record-protect slot on the MD is open. Edit after closing the slot.

When "TOC" flashes in the display

Do not move the deck or pull out the AC power cord. After editing, "TOC" lights continuously until you eject the MD or turn off the power. "TOC Writing" flashes while the deck is updating the TOC. When the deck finishes updating the TOC, "TOC" goes off.

Erasing Recordings (Erase Function)

Do the procedures below to erase following:
- A single track
- All tracks

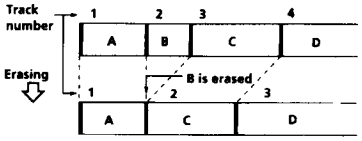


Erasing a single track

You can erase a track simply by specifying the respective track number. When you erase a track, the total number of tracks on the MD decreases by one and all tracks following the erased one are renumbered. Since erasing merely updates the TOC, there is no need to record over material.

To avoid confusion when erasing multiple tracks, you should proceed in order of high to low track number to prevent the renumbering of tracks that have not been erased yet.

Example: Erasing B



1 While the deck is stopped, playing, or pausing, press EDIT/NO.

2 Turn AMS until "Erase ?" appears in the display.

3 Press AMS.
The display for erasing tracks appears and playback of the displayed track starts.

4 Turn AMS to select the track to be erased.

5 Press AMS or YES.
When the track selected in Step 4 has been erased, "Complete!!" appears for a few seconds and the total number of tracks in the music calendar decreases by one.
If you erase a track during playback, the track following the deleted track begins playing afterwards.

6 Repeat Steps 1 to 5 to erase more tracks.

To cancel the Erase Function

Press EDIT/NO or ■.

Note

If "Erase ???"appears in the display, the track was recorded or edited on another MD deck and is record-protected. If this indication appears, press YES to erase the track.

Erasing all tracks on an MD

Erasing a recordable MD deletes the disc name, all recorded tracks, and titles (see page 36).

1 While the deck is stopped, playing, or pausing, press EDIT/NO.

2 Turn AMS until "All Erase ?" appears in the display.

3 Press AMS.
"All Erase??" appears in the display and all tracks in the music calendar start flasing.

4 Press AMS or YES.
When the disc name, all recorded tracks, and titles on the MD has been erased, "Complete!!" appears for a few seconds and the music calendar disappears.

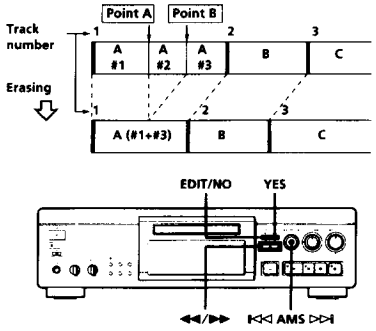
To cancel the Erase Function
Press EDIT/NO or ■ to turn off the "All Erase ?" or "All Erase??" indication.

You can undo the Erase Function
See "Undoing the Last Edit" on page 36.

Erasing a Part of a Track (A-B Erase Function)

You can specify a portion within a track and erase the portion with ease. It is convenient when erasing unnecessary sections after recording satellite broadcast or FM broadcast.

Example: Erasing a part of track A



1 While the deck is stopped, playing, or pausing, press EDIT/NO.

2 Turn AMS until "A-B Erase ?" appears in the display.

3 Press AMS.

4 Turn AMS to select the number of the track, then press AMS.
"-Rehearsal-" and "Point A ok?" alternates in the display while the deck plays back the selected track from the beginning.

5 While monitoring the sound, turn AMS to find the starting point of the portion to be erased (point A).
You can select the unit by which the starting point is shifted. Press the ◀◀ or ▶▶ button to select frame, second, or minute.
For frame, the number of frames appears when you turn the AMS control; for second and minute, "S" or "M" flashes in the display.

6 If the point A is still incorrect, repeat Step 5 until it is correct.

7 Press YES or AMS if the position is correct.
"Point B Set" appears in the display and playback for setting the end point of the portion to be erased (point B) starts.

8 Continue playback until the deck reaches point B, then press YES or AMS.
"A-B Ers" and "Point B ok?" alternates in the display while the deck repeats a portion of a few seconds before point A and after point B successively.

9 Repeat Step 5 if point B is not correct.

10 Press YES or AMS when the position is correct.
"Complete!!" appears for a few seconds and the portion between point A and B is erased.

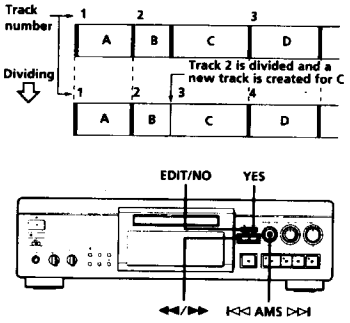
To cancel the A-B Erase Function
Press ■.

Note
If "Impossible" appears in the display, the specified portion cannot be erased. This is due to a technical limitation of the MD system and is not a mechanical error.

Dividing Recorded Tracks (Divide Function)

With the Divide Function you can assign a track number at places that you want to randomly access afterwards. Use this function to add tracks to MDs recorded from an analog source (and therefore contain no track numbers), or to divide an existing track into multiple portions for locating positions in the middle of a track. When you divide a track, the total number of tracks on the MD increases by one and all tracks following the divided track are renumbered.

Example: Dividing track 2 to create a new track for C



Dividing a track after selecting the track

1 While the deck is stopped, playing, or pausing, press EDIT/NO.

2 Turn AMS until "Divide ?" appears in the display and press AMS.

3 Turn AMS to select the track to be divided and press AMS.
"-Rehearsal-" appears in the display and the deck plays back the selected track from the beginning.

(Continued)

4 While monitoring the sound, turn AMS to find the point to divide the track.
You can select the unit by which the starting point is shifted. Press the ◀◀ or ▶▶ button to select frame, second, or minute.
For frame, the number of frames appears when you turn the AMS control; for second and minute, "S" or "M" flashes in the display.

5 Press YES or AMS when the position is correct.
"Complete!!" appears for a few seconds and the newly created track begins playing. The new track will have no track title even if the original track was labeled. The total number of tracks in the music calender increases by one.

To cancel the Divide Function
Press ■.

You can undo a track division
Combine the tracks again (see "Combining Recorded Tracks" on this page) then redivide the tracks if necessary.

You can divide a track while recording
Use the Track Marking Function (see page 14).

Dividing a track after selecting the dividing point

1 While playing the MD, press AMS at the point where you want to create a new track.
"-Rehearsal-" appears in the display and playback continues from the position you selected.

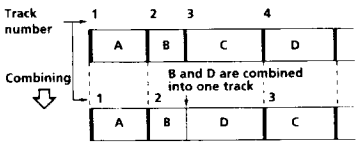
2 To make fine adjustment on the dividing position, do Step 4 in "Dividing a track after selecting the track" on this page.

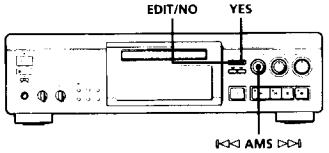
3 Press EDIT/NO to display "Divide ?" and press YES or AMS.

Combining Recorded Tracks (Combine Function)

Use the Combine Function to combine tracks on a recorded MD. The two tracks to be combined need not to be consecutive and the latter track to be combined can be the track which comes before the former one in the track number order. This function is useful for combining several songs into a single medley, or several independently recorded portions into a single track. When you combine two tracks, the total number of tracks decreases by one and all tracks following the combined tracks are renumbered.

Example: Combining B and D



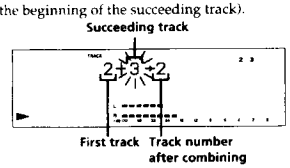


1 While the deck is stopped, playing, or pausing, press EDIT/NO.

2 Turn AMS until "Combine ?" appears in the display.

3 Press AMS.

4 Turn AMS to select the first track of the two to be combined and press AMS.
The display for selecting the second track appears and the deck repeats the portion where the two tracks will join (i.e., the end of the first track and the beginning of the succeeding track).



5 Turn AMS to select the second track of the two to be combined and press YES or AMS.
"Complete!!" appears for a few seconds and the total number of tracks in the music calendar decreases by one.
If both of the combined tracks have track titles, the title of the second track is erased.

To cancel the Combine Function
Press EDIT/NO or ■.

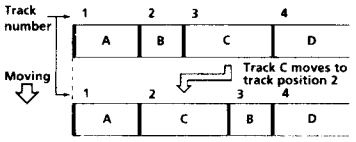
You can undo the Combine Function
Divide the tracks again (see "Dividing Recorded Tracks" on page 31), then repeat the combine function with the correct tracks if necessary.

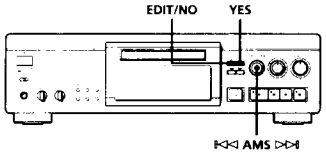
Note
If "Impossible" appears in the display, the tracks cannot be combined. This sometimes happens when you've edited the same track many times, and is due to a technical limitation of the MD system, not a mechanical error.

Moving Recorded Tracks (Move Function)

Use the Move Function to change the order of any track. After you move a track, the track numbers between the new and old track positions are automatically renumbered.

Example: Moving track C to track position 2





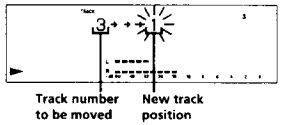
1 While the deck is stopped, playing, or pausing, press EDIT/NO.

2 Turn AMS until "Move ?" appears in the display.

3 Press AMS.

4 Turn AMS to select the track to be moved and press AMS.

5 Turn AMS until the new track position appears.

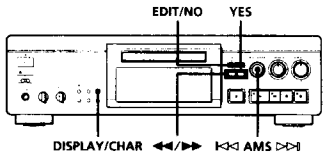


6 Press YES or AMS.
"Complete!!" appears for a few seconds and the moved track begins playing back if the deck is in playback mode.

To cancel the Move Function
Press EDIT/NO or ■.

Labeling Recordings (Title Function)

You can create titles for your recorded MDs and tracks. Titles — which may consist of uppercase and lowercase letters, numbers and symbols for a maximum of about 1,700 characters per disc — appear in the display during MD operation. You can label a track or an MD by using the controls on the deck or on the remote.



Use the following procedure to label a track or an MD. **You can label a track while it is playing, pausing or recording. If the track is playing or recording, be sure to finish labeling before the track ends. If the track ends before you've completed the labeling procedure, the characters already entered are not recorded and the track will remain unlabeled.**

1 Press EDIT/NO.

2 Turn AMS until "Name ?" appears in the display and press AMS.

(Continued)

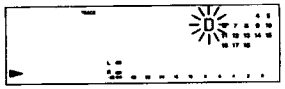
3 Turn AMS until "Name in ?" appears in the display, then press AMS.

4 Turn AMS to select "Disc" to label an MD, or to specify the track to label, and press AMS.
A flashing cursor appears in the display.

5 Press DISPLAY/CHAR to select the character type as follows:

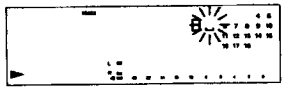
To select	Press DISPLAY/CHAR repeatedly until
Uppercase letters	"A" appears in the display
Lowercase letters	"a" appears in the display
Numbers	"0" appears in the display

6 Turn AMS to select the character.
The selected character flashes.
Letters, numbers, and symbols appear in sequential order as you turn AMS.
You can use the following symbols in titles:
! " # $ % & ' ( ) * + , - . / : ; < = > ? @ _ `



You can press DISPLAY/CHAR to change the character type at any time during Step 6 (see Step 5).

7 Press AMS to enter the selected character.
The cursor shifts rightward and waits for the input of the next character.



8 Repeat Steps 6 and 7 until you have entered the entire title.

If you entered the wrong character
Press ◀◀ or ▶▶ until the character to be corrected starts flashing, and repeat Steps 6 and 7 to enter the correct character.

To erase a character
Press ◀◀ or ▶▶ until the character to be erased starts flashing, then press EDIT/NO.

To enter a space
Press AMS or ▶▶ while the cursor is flashing.

9 Press YES.
This completes the labeling procedure and the title appears in the display.

To cancel labeling
Press ■.

Note
You cannot label a track or an MD while you are recording over an existing track.

Copying a track or disc title

You can copy a track or disc title to use it as a title of another track or the disc title within a disc. Note that you can do this operation by using the controls on the deck only.

1 Press EDIT/NO.

2 Turn AMS until "Name ?" appears in the display and press AMS.

3 Turn AMS until "Nm Copy ?" appears in the display.

4 Press AMS.

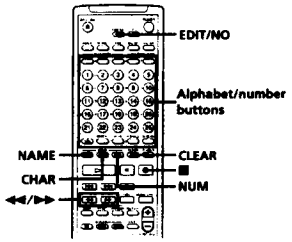
5 Turn AMS to select "Disc" to copy the disc title, or the track whose title you want to copy and press AMS.

If "No Name" appears in the display
The disc or the track has no name.

6 Turn AMS to select "Disc" for disc title or to specify the track number to copy a title, and press AMS.
"Complete!!" appears for a few seconds to indicate that the copying operation is completed.

To cancel title copying
Press EDIT/NO or ■.

Labeling tracks and MDs with the remote



1 Press NAME repeatedly until a flashing cursor appears in the display, then do the following:

To label	Make sure that the deck is
A track	Playing, pausing, recording the track to be labeled, or stopped after locating the track to be labeled
An MD	Stopped with no track number appearing in the display

2 Select the character type as follows:

To select	Press
Uppercase letters	CHAR repeatedly until "Selected AB" appears in the display
Lowercase letters	CHAR repeatedly until "Selected ab" appears in the display
Numbers	NUM repeatedly until "Selected 12" appears in the display

3 Press an alphabet/number button to enter a character.
After you enter a character, the cursor shifts rightward and waits for the input of the next character.
You can change the character type at any time during Step 3 (see Step 2).

4 Repeat Step 3 until you have entered the entire title.

If you entered the wrong character
Press ◀◀ or ▶▶ until the character to be corrected starts flashing.
Press CLEAR to erase the incorrect character, then enter the correct one.

5 Press NAME again.
This completes the labeling procedure and the title appears in the display.

To cancel labeling
Press ■.

Changing an existing title

1 Press NAME, then do the following:

To change	Make sure that the deck is
A track title	Playing, pausing the track whose title is to be changed, or stopped after locating the track whose title is to be changed
A disc name	Stopped with no track number appearing in the display

2 Hold down CLEAR or EDIT/NO until the current title is erased.

3 Enter the new title.
Do Steps 5 to 8 of "Labeling Recordings" on page 34, or Steps 2 to 4 of "Labeling tracks and MDs with the remote" on this page.

4 Press NAME.

Erasing a title on a disc (Name Erase)

Use this function to erase a title on a disc.

1 While the deck is stopped, playing, or pausing, press EDIT/NO.

2 Turn AMS until "Name ?" appears in the display and press AMS.

3 Turn AMS until "Nm Erase ?" appears in the display and press AMS.

4 Turn AMS to select "Disc" to erase the disc title, or the track whose title you want to erase and press AMS.
"Complete!!" appears for a few seconds and the title is erased.

To cancel Name Erase Function
Press ■.

Erasing all titles on a disc (Name All Erase)

Use this function to erase all titles on an MD simultaneously.

1 While the deck is stopped, press EDIT/NO.

2 Turn AMS until "Name ?" appears in the display and press AMS.

3 Turn AMS until "Nm All Ers ?" appears in the display and press AMS.
"Nm All Ers??" appears in the display.

4 Press AMS.
"Complete!!" appears for a few seconds and the all the titles is erased.

To cancel the Name All Erase Function
Press ■.

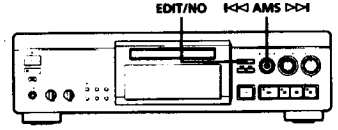
You can undo the Name All Erase Function
See "Undoing the Last Edit" on this page.

You can erase all recorded tracks and titles
See "Erasing all tracks on an MD" on page 30.

Undoing the Last Edit (Undo Function)

You can use the Undo Function to cancel the last edit and restore the contents of the MD to the condition that existed before editing was done. Note, however, that you cannot undo an edit if you do any of the following after the edit:

- Press the ● REC button on the deck.
- Press the ● button, the MUSIC SYNC button, or the CD SYNC STANDBY button on the remote.
- Update the TOC by turning off the power or ejecting the MD.
- Disconnect the AC power cord or set the MAIN POWER switch on the rear panel to OFF (only on European model).



1 With the deck stopped and no track number appearing in the display, press EDIT/NO and turn AMS until "Undo ?" appears in the display.
"Undo ?" does not appear if no editing has been done.

2 Press AMS.
One of the following messages appears in the display, depending on the type of editing to be undone:

Editing done:	Message:
Erasing a single track	"Erase Undo ?"
Erasing all tracks on an MD	
Erasing a part of a track	
Dividing a track	"Divide Undo ?"
Combining tracks	"CombinUndo ?"
Moving a track	"Move Undo ?"
Labeling a track or an MD	"Name Undo ?"
Changing an existing title	
Erasing all titles on an MD	
Copying a title	

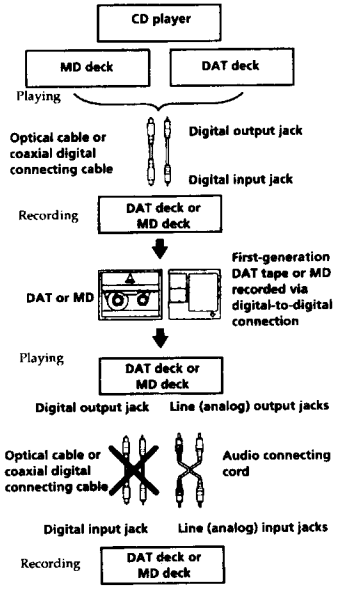
3 Press AMS again.
"Complete!!" appears for a few seconds and the contents of the MD are restored to the condition that existed before the edit.

To cancel the Undo Function
Press EDIT/NO or ■.

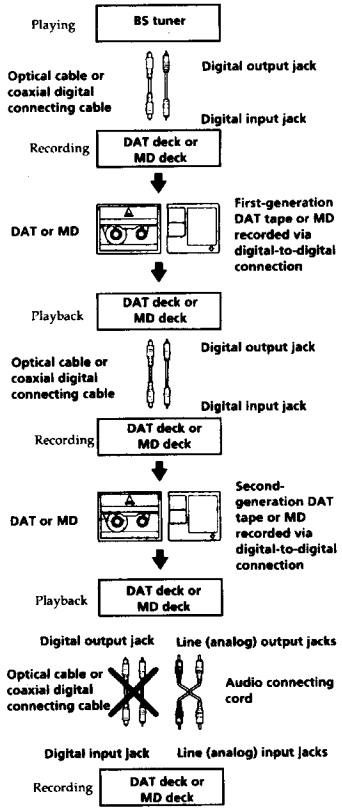
Guide to the Serial Copy Management System

This MD deck uses the Serial Copy Management System, which allows only first-generation digital copies to be made of premastered software via the deck's digital input jack. An outline of this system appears below:

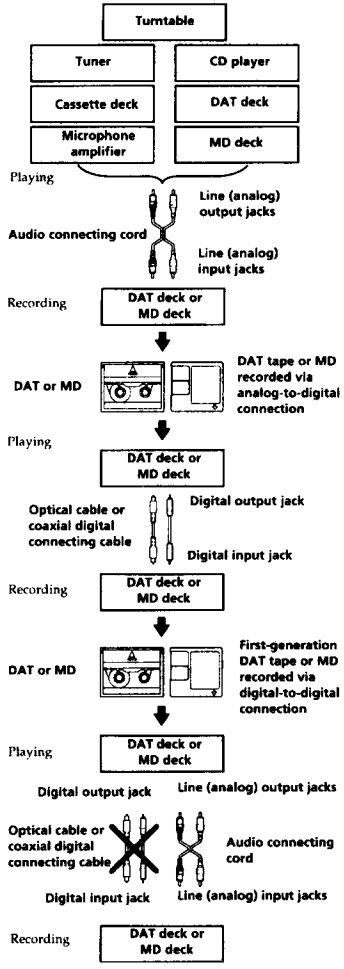
1 You can record from digital program sources (CDs, DATs or premastered MDs) onto a DAT tape or recordable MD via digital input jack on the DAT or MD deck.
You cannot, however, record from this recorded DAT tape or MD onto another DAT tape or recordable MD via the digital input jack on the DAT or MD deck.



2 You can record the digital input signal of a digital satellite broadcast onto a DAT tape or recordable MD via the digital input jack on the DAT or MD deck which is capable of handling a sampling frequency of 32 kHz or 48 kHz.
You can then record the contents of this recorded DAT tape or MD (first-generation) onto another DAT tape or recordable MD via digital input jack on the DAT or MD deck to create a second-generation digital copy.
Subsequent recording from the second-generation copy onto another recordable DAT tape or MD is possible only through the analog input jack on the DAT or MD deck.
Note, however, that on some BS tuners, second-generation digital copying may not be possible.



3 You can record a DAT tape or MD recorded via the DAT or MD deck's analog input jack onto another DAT tape or MD via the DAT or MD deck's digital output jack. You cannot, however, make a second-generation DAT tape or MD copy via the DAT or MD deck's digital output jack.



Index

A, B
A-B erase 30
A-B repeat 23
Adjusting
  analog recording level 14
  analog signal level 26
  digital recording level 13
AMS (Automatic Music Sensor) 21
Audio connecting cord 4, 5, 40, 41
Auto cut 11
Auto pause 25
Auto space 25

C
CD synchro-recording 17
Changing
  an existing title 35
  bit length 26
  display 21
  order of programmed tracks 25
Checking
  order of programmed tracks 24
  remaining time 11, 20
  playing time 20
  total number of tracks 20
  track number 20
Cleaning 3
Clock
  changing date and time 6
  displaying date and time 6
  setting 6
Coaxial digital connecting cable 4, 5, 40, 41
Combining 32

D
Digital filter 27
Display messages 37
Dividing
  after selecting the dividing point 32
  after selecting the track 31

E
Erasing
  all titles 36
  all tracks 30
  a part of a track 30
  a single track 29
  a title 35

F, G
Fade-in
  playback 27
  recording 18
Fade-out
  playback 28
  recording 18

(Continued)

Table of Setup Menus

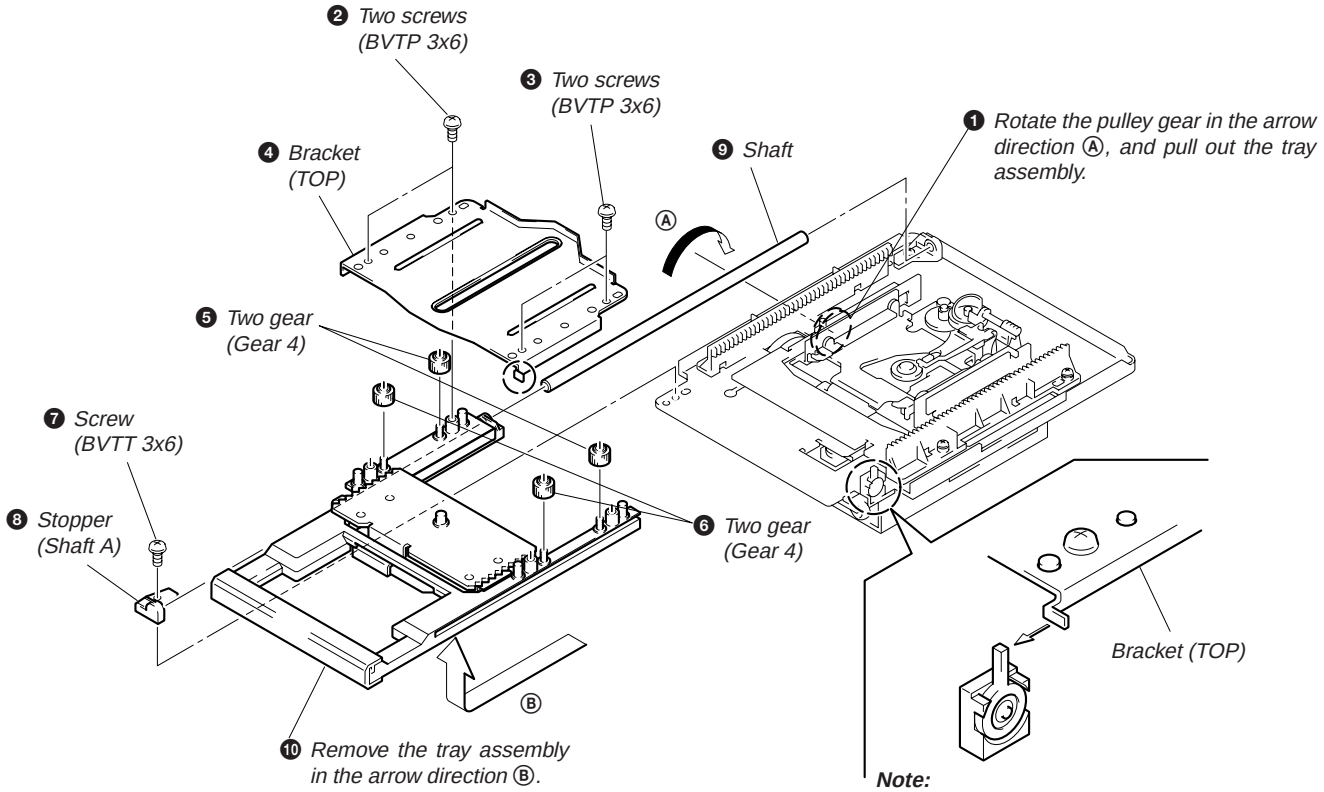
You can make various settings on this deck by using setup menus. Operation related to each menu were explained in the previous sections. The table below outlines each menu, including the various parameters and default settings.

Menu number	Function	Parameters	Default setting	See
S01	Creates a program.	—	—	page 24
S02	Sets the track marking function.	T.Mark Off, T.Mark LSyn, T.Mark 1min, T.Mark 5min	T.Mark LSyn	page 14
S03	Sets the reference level of the input signal when "T.Mark LSyn" is selected in the S02 menu	LS(T)–72 to 0dB	LS(T)–50dB	page 15
S04	Sets the duration of silence portion to be detected when "T.Mark LSyn" is selected in the S02 menu	LS(W)0.0 to 9.5s	LS(W)1.5s	page 15
S05	Sets the Resume Play mode.	Resume Off, Resume Play, Resume Next	Resume Off	page 26
S06	Switches the bit length for the digital output signal.	Dout 20bit, Dout 16bit	Dout 20bit	page 26
S07	Turns the Auto Space and Auto Pause Functions on and off.	Auto Off, Auto Space, Auto Pause	Auto Off	page 25
S08	Turn the Smart Space Function on and off.	S.Space Off, S.Space On	S.Space On	page 11
S09	Turns the No Clip Function on and off.	No Clip On, No Clip Off	No Clip Off	page 13
S10	Turns the Peak Hold function on and off for the peak level meters.	P.Hold On, P.Hold Off	P.Hold Off	page 14
S11	Sets the playing time during music scan.	M.Scan 6 to 20s	M.Scan 6s	page 22
S12	Selects the signal to be adjusted using the DIGITAL REC LEVEL control.	DigLvl Off, DigLvl Rec, DigLvl All	DigLvl Rec	pages 13 and 26
S13	Selects the type of increment/decrement curve of the signal level when the DIGITAL REC LEVEL control is turned.	DigLvl Lin, DigLvl Sin, DigLvl Log	DigLvl Lin	page 13
S14	Sets the duration of fade-in recording and playback.	FadeIn 1.0 to 15s	FadeIn 5.0s	pages 18 and 28
S15	Sets the duration of fade-out recording and playback.	FadeOut 1.0 to 15s	FadeOut 5.0s	pages 18 and 28
S16	Selects the type of increment curve of the signal level for fade-in recording and playback.	FadeIn Lin, FadeIn Sin, FadeIn Log	FadeIn Lin	pages 18 and 28
S17	Selects the type of decrement curve of the signal level for fade-out recording and playback.	FadeOut Lin, FadeOut Sin, FadeOut Log	FadeOut Lin	pages 18 and 28

SECTION 3
DISASSEMBLY

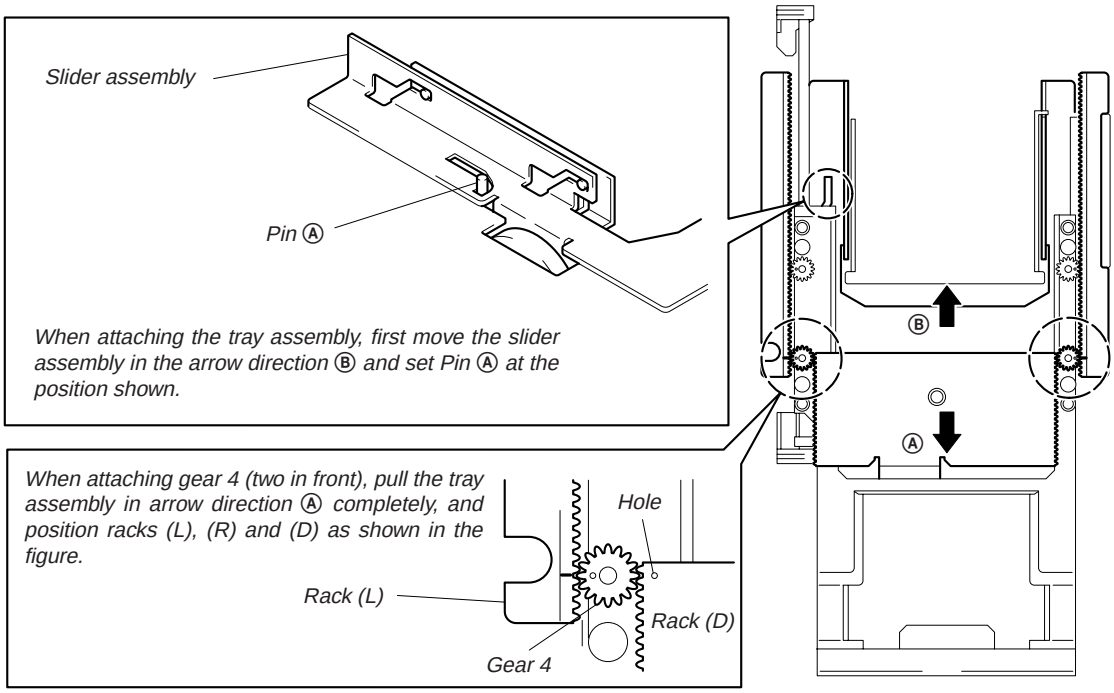
Note : Follow Xthe disassembly procedure in the numerical order given.

3-1. TRAY ASSEMBLY

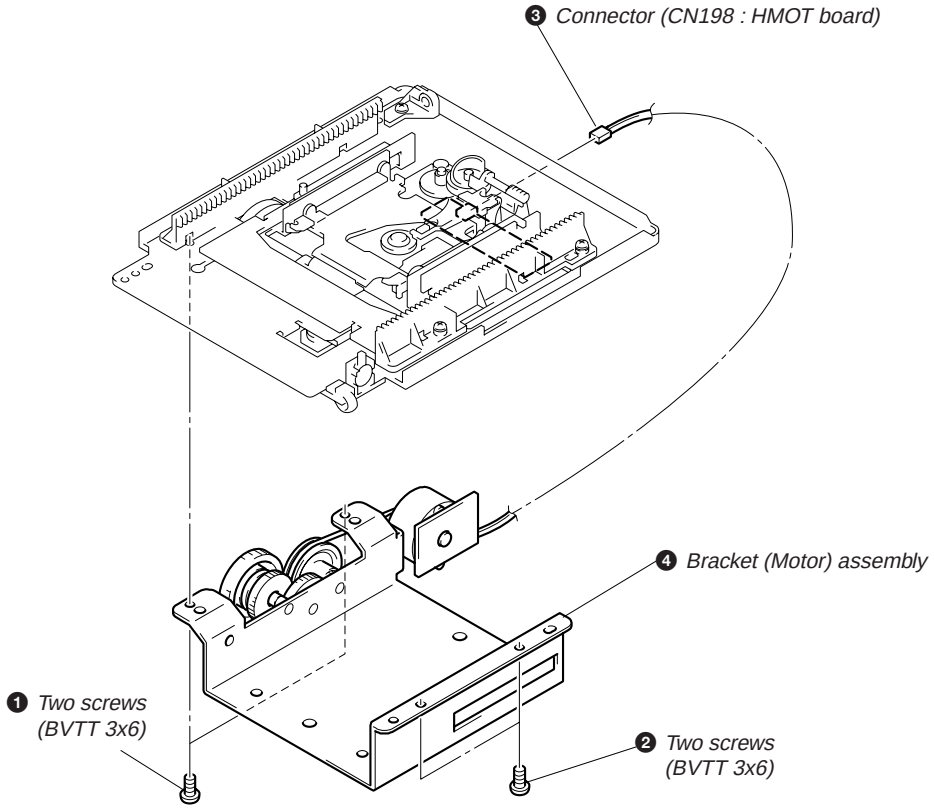

❷ Two screws (BVTP 3x6)
❸ Two screws (BVTP 3x6)
❹ Bracket (TOP)
❾ Shaft
❶ Rotate the pulley gear in the arrow direction Ⓐ, and pull out the tray assembly.
Ⓐ
❺ Two gear (Gear 4)
❼ Screw (BVTT 3x6)
❽ Stopper (Shaft A)
❻ Two gear (Gear 4)
Ⓑ
❿ Remove the tray assembly in the arrow direction Ⓑ.
Bracket (TOP)
Note:
When attaching the bracket (TOP), attach while pressing the switch as shown in the figure.

- **Precautions on Attaching**

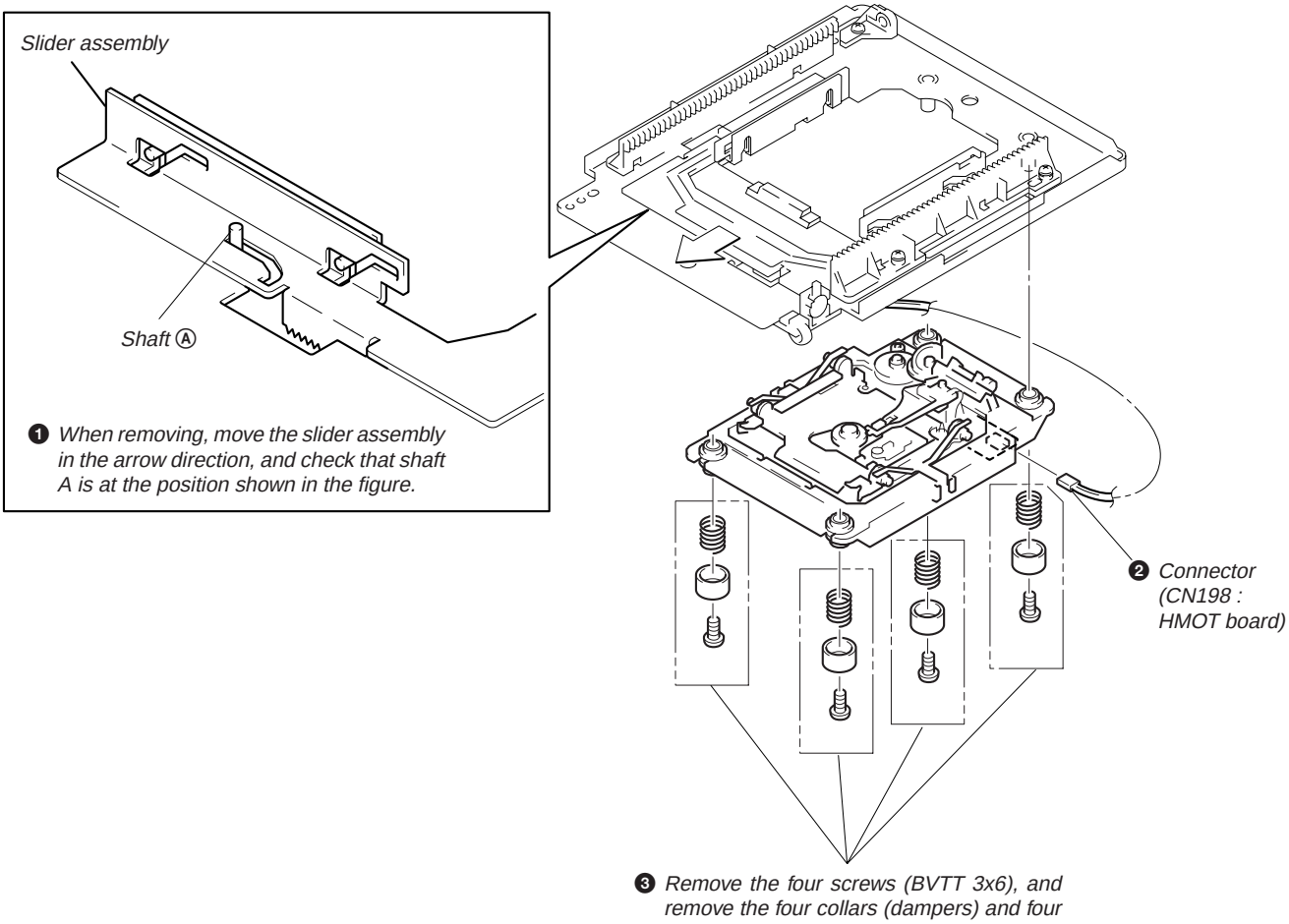
(Assemble in the reverse order of removal.)


Slider assembly
Pin Ⓐ
When attaching the tray assembly, first move the slider assembly in the arrow direction Ⓑ and set Pin Ⓐ at the position shown.
Ⓑ
Ⓐ
When attaching gear 4 (two in front), pull the tray assembly in arrow direction Ⓐ completely, and position racks (L), (R) and (D) as shown in the figure.
Hole
Rack (L)
Rack (D)
Gear 4

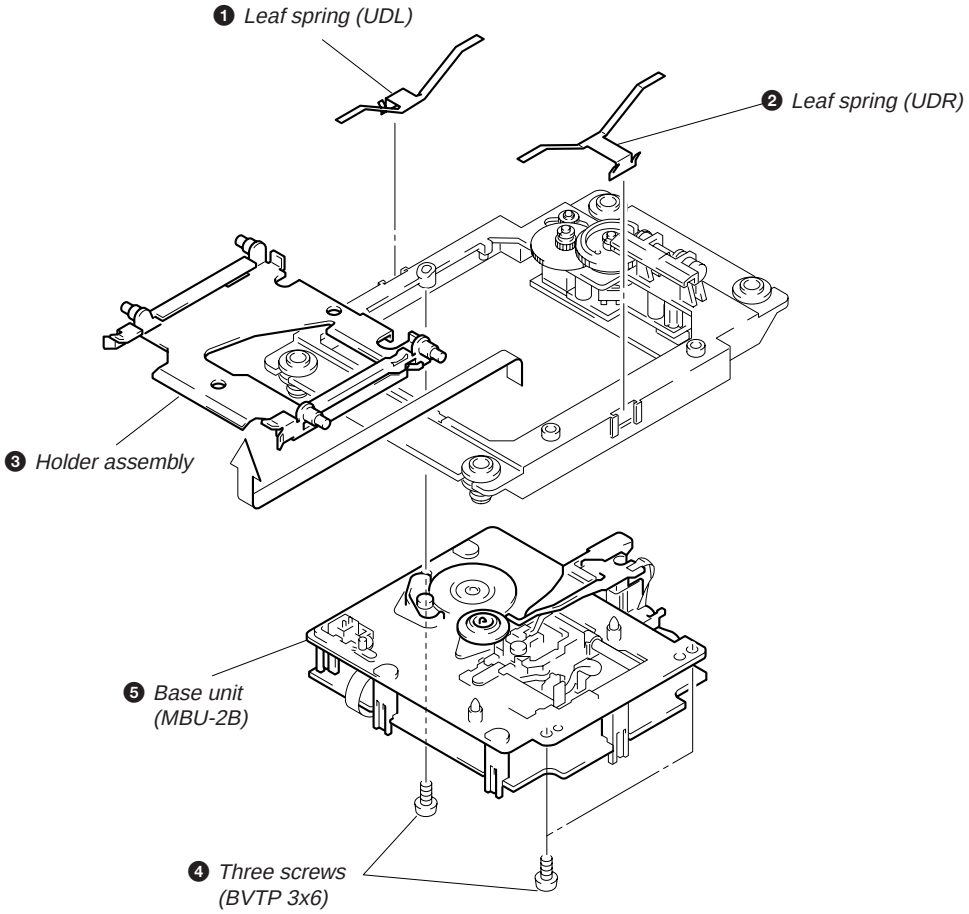
3-2. BRACKET (MOTOR) ASSY



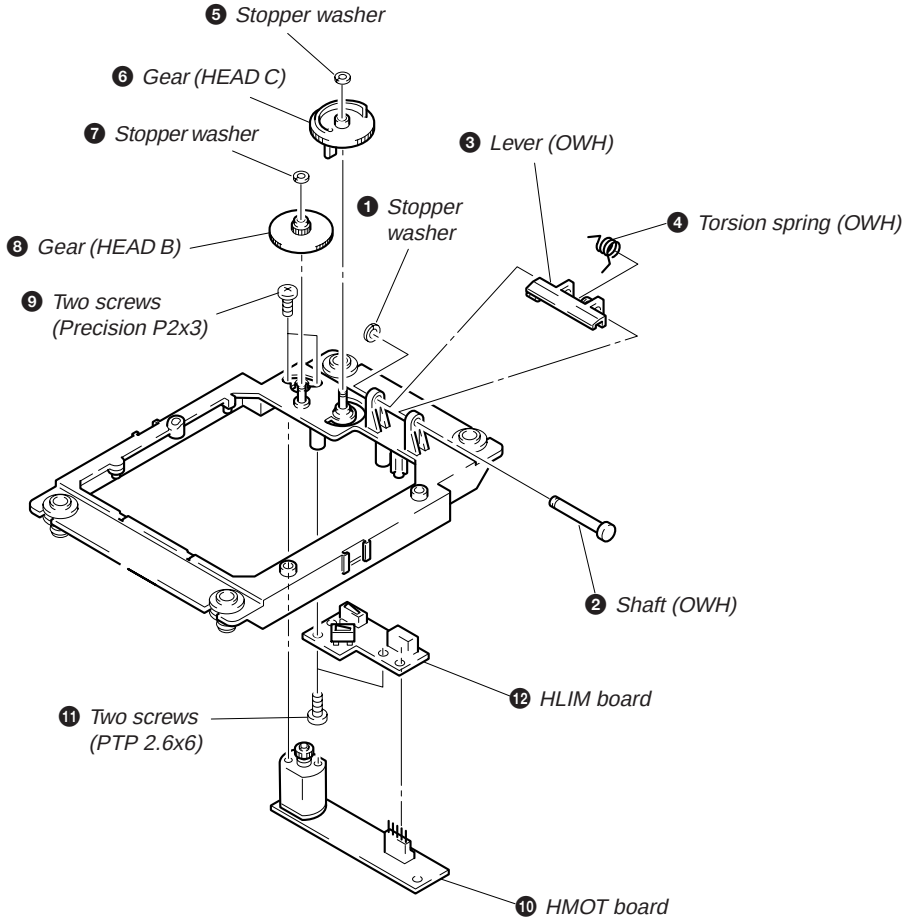
3-3. HOLDER ASSY


Slider assembly
Shaft Ⓐ
❶ When removing, move the slider assembly in the arrow direction, and check that shaft A is at the position shown in the figure.
❷ Connector (CN198 : HMOT board)
❸ Remove the four screws (BVTT 3x6), and remove the four collars (dampers) and four compression springs.

3-4. BASE UNIT



3-5. HMOT BOARD AND HLIM BOARD



SECTION 4
TEST MODE

4-1. Setting the Test Mode

While pressing the AMS knob, insert the power plug into the power supply inlet, and release the AMS knob.

4-2. Exiting the Test Mode

Press the REPEAT button. Unplug the power plug from an outlet.

4-3. Basic Operations of the Test Mode

All operations are performed using the AMS knob, YES button, and NO button.
The functions of these buttons are as follows.

Function	Contents
AMS knob	Changes parameters and modes
YES button	Proceeds onto the next step. Finalizes input.
NO button	Returns to previous step. Stops operations.

4-4. Selecting the Test Mode

Eight test modes are selected by turning the AMS knob.

Display	Contents
TEMP ADJUS	Temperature compensation offset adjustment
LDPWR ADJUS	Laser power adjustment
EFBAL ADJUS	Traverse adjustment
FBIAS ADJUS	Focus bias adjustment
FBIAS CHECK	Focus bias check
CPLAY MODE	Continuous playback mode
CREC MODE	Continuous recording mode
EP MODE	Non-volatile memory mode *

For detailed description of each adjustment mode, refer to 5. Electrical Adjustments.
If a different adjustment mode has been selected by mistake, press the NO button to exit from it.
* The EP MODE is not used in servicing. If set accidentally, press the NO button immediately to exit it.

4-4-1. Operating the Continuous Playback Mode

1. Entering the continuous playback mode
   ① Set the disc in the unit (either MO or CD).(MO: Recordable disc, CD: Disc for playback only).
   ② Rotate the AMS knob and display “CPLAY MODE”.
   ③ Press the YES button to change the display to “CPLAY IN”.
   ④ When access completes, the display changes to “C1 = □□□□ AD = □□”.
   Note : The “□” displayed are arbitrary numbers.
2. Changing the parts to be played back
   ① Press the YES button during continuous playback to change the display to “CPLAY MID”, “CPLAY OUT”. When pressed another time, the parts to be played back can be changed.
   ② When access completes, the display changes to “C1 = □□□□ AD = □□”.
   Note : The “□” displayed are arbitrary numbers.
3. Ending the continuous playback mode
   ① Press the NO button. The display will change to “CPLAY MODE”.
   ② Press the ⏏OPEN/CLOSE button and remove the disc.
   Note 1 : The playback start addresses for IN, MID, and OUT are as follows.
   IN 40h cluster
   MID 300h cluster
   OUT 700h cluster

4-4-2. Operating the Continuous Recording Mode

1. Entering the continuous recording mode
   ① Set the MO disc in the unit.
   ② Rotate the AMS knob and display “CREC MODE”.
   ③ Press the YES button to change the display to “CREC IN”.
   ④ When access completes, the display changes to “CREC (□□□□□” and **REC** lights up.
   Note : The “□” displayed are arbitrary numbers.
2. Changing the parts to be recorded
   ① When the YES button is pressed during continuous recording, the display changes to “CREC MID”, “CREC OUT” and **REC** goes off.
   When pressed another time, the parts to be recorded can be changed.
   ② When access completes, the display changes to “CREC (□□□□□” and **REC** lights up.
   Note : The “□” displayed are arbitrary numbers.
3. Ending the continuous recording mode
   ① Press the NO button. The display changes to “CREC MODE” and **REC** goes off.
   ② Press the ≙OPEN/CLOSE button and remove the disc.
   Note 1 : The recording start addresses for IN, MID, and OUT are as follows.
   IN 40h cluster
   MID 300h cluster
   OUT 700h cluster
   Note 2 : The NO button can be used to stop recording anytime.
   Note 3 : During the test mode, the erasing-protection tab will not be detected. Therefore be careful not to set the continuous recording mode when a disc not to be erased is set in the unit.
   Note 4 : Do not perform continuous recording for long periods of time above 5 minutes.
   Note 5 : During continuous recording, be careful not to apply vibration.

4-4-3. Non-Volatile Memory Mode

This mode reads and writes the contents of the non-volatile memory.
It is not used in servicing. If set accidentally, press the NO button immediately to exit it.

4-5. Functions of Other buttons

Function	Contents
▷	Sets continuous playback when pressed in the STOP state. When pressed during continuous playback, the tracking servo turns ON/OFF.
■	Stops continuous playback and continuous recording.
▶▶	The sled moves to the outer circumference only when this is pressed.
◀◀	The sled moves to the inner circumference only when this is pressed.
●	Turns recording ON/OFF when pressed during continuous playback.
SCROLL/ CLOCK SET	Switches between the pit and groove modes when pressed.
PLAY MODE	Switches the spindle servo mode (CLVS and A).
DISPLAY/ CHAR	Switches the display when pressed.Returns to previous step. Stops operations.

Note : The erasing-protection tab is not detected during the test mode. Recording will start regardless of the position of the erasing-protection tab when the ● button is pressed.

4-6. Test Mode Displays

Each time the DISPLAY/CHAR button is pressed, the display changes in the following order.
MODE display ⟶ Error rate display ⟶ Address display

1. MODE display
   Displays “TEMP ADJUS”, “CPLAY MODE”, etc.
2. Error rate display
   Error rates are displayed as follows.
   C1 = □□□□ AD = □□□□
   C1 = : Indicates C1 error
   AD = : Indicates ADER
3. Address display
   Addresses are displayed as follows.
   “h = □□□□ s = □□□□” (MO pit and CD)
   “h = □□□□ a = □□□□” (MO groove)
   h = : Header address
   s = : SUBQ address
   a = : ADIP address
   * “—” is displayed when the address cannot be read.

4-7. Meanings of Other Displays

Display	Contents		
	Light	Off	Blinking
▷	During continuous playback	STOP	
▮▮	Tracking servo OFF	Tracking servo ON	
REC	Recording mode ON	Recording mode OFF	
CLOCK	CLV LOCK	CLV UNLOCK	
TRACK	Pit	Groove	
DISC	High reflection	Low reflection	
DATE	CLV-S	CLV-A	
A. SPACE	ABCD adjustment completed		
A – B	(Focus auto gain successful Tracking auto gain successful)		(Focus auto gain successful Tracking auto gain failed)

4-8. Precautions for Use of Test Mode

① As loading related operations will be performed regardless of the test mode operations being performed, be sure to check that the disc is stopped before setting and removing it.
Even if the ⏏OPEN/CLOSE button is pressed while the disc is rotating during continuous playback, continuous recording, etc., the disc will not stop rotating.
Therefore, it will be ejected while rotating.
Always press the NO button first before pressing the ⏏OPEN/CLOSE button.

② The erasing-protection tab is not detected in the test mode. Therefore, when modes which output the recording laser power such as continuous recording mode and traverse adjustment mode, etc. are set, the recorded contents will be erased regardless of the position of the tab. When using a disc that is not to be erased in the test mode, be careful not to enter the continuous recording mode and traverse adjustment mode.

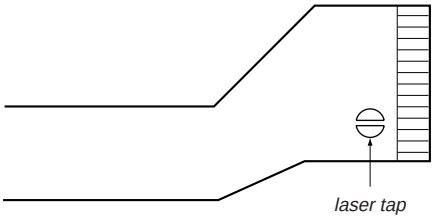
SECTION 5
ELECTRICAL ADJUSTMENTS

Precautions for Checking Laser Diode Emission

To check the emission of the laser diode during adjustments, never view directly from the top as this may lose your eye-sight.

Precautions for Use of optical pick-up (KMS-210A)

As the laser diode in the optical pick-up is easily damaged by static electricity, solder the laser tap of the flexible board when using it. Before disconnecting the connector, desolder first. Before connecting the connector, be careful not to remove the solder. Also take adequate measures to prevent damage by static electricity. Handle the flexible board with care as it breaks easily.



Optical pick-up flexible board

- Abbreviation
  MO: Recordable disc
  CD: Disc for playback only

Precautions for Adjustments

1) When replacing the following parts, perform the adjustments and checks with ○ in the order shown in the following table.

	Optical Pick-up	BD Board		
		IC171	D101	IC101, IC121, IC191
1. Temperature compensation offset adjustment	×	○	○	○
2. Laser power adjustment	○	×	×	○
3. Traverse adjustment	○	○	×	○
4. Focus bias adjustment	○	○	×	○
5. Error rate check	○	○	×	○

2) Set the test mode when performing adjustments.
   After completing the adjustments, exit the test mode.
3) Perform the adjustments in the order shown.
4) Use the following tools and measuring devices.
   - Check Disc (MD) TDYS-1 (Parts No. 4-963-646-01)
   - Laser power meter LPM-8001 (Parts No. J-2501-046-A)
   - Oscilloscope
   - Digital voltmeter
   - Thermometer
5) When observing several signals on the oscilloscope, etc., make sure that VC and ground do not connect inside the oscilloscope.
   (VC and ground will become short-circuited.)

Creating Continuously Recorded Disc

* This disc is used in focus bias adjustment and error rate check. The following describes how to create a continuous recording disc.

1. Insert a MO disc (blank disc) commercially available.
2. Rotate the AMS knob and display “CREC MODE”.
3. Press the YES button and display “CREC IN”.
4. Press the YES button again to display “CREC MID”.
   “CREC (0300” is displayed for a moment and recording starts.
5. Complete recording within 5 minutes.
6. Press the NO button and stop recording .
7. Press the ⏏OPEN/CLOSE button and remove the MO disc.

The above has been how to create a continuous recording data for the focus bias adjustment and error rate check.

Note :

- Be careful not to apply vibration during continuous recording.

Temperature Compensation Offset Adjustment

Save the temperature data at that time in the non-volatile memory as 25 ˚C reference data.

Note :

1. Usually, do not perform this adjustment.
2. Perform this adjustment in an ambient temperature of 22 ˚C to 28 ˚C. Perform it immediately after the power is turned on when the internal temperature of the unit is the same as the ambient temperature.
3. When D101 has been replaced, perform this adjustment after the temperature of this part has become the ambient temperature.

Adjusting Method :

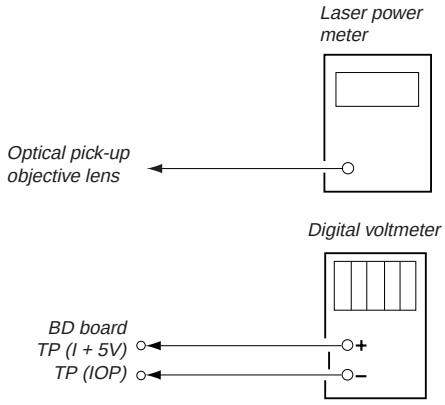
1. Rotate the AMS knob and display “TEMP ADJUS”.
2. Press the YES button and select the “TEMP ADJUS” mode.
3. “TEMP = ▯▯” and the current temperature data will be displayed.
4. To save the data, press the YES button.
   When not saving the data, press the NO button.
5. When the YES button is pressed, “TEMP = ▯▯ SAV” will be displayed for some time, followed by “TEMP ADJUS”.
   When the NO button is pressed, “TEMP ADJUS” will be displayed.

Specifications :

The “TEMP = ▯▯” should be within “E0 - EF”, “F0 - FF”, “00 - 0F”, “10 - 1F” and “20 - 2F”.

Laser Power Adjustment

Connection :

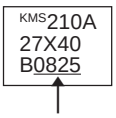


Adjusting Method :

1. Set the laser power meter on the objective lens of the optical pick-up. (When it cannot be set properly, press the ◀◀ button or ▶▶ button and move the optical pick-up.)
   Connect the digital volt meter to TP (IOP) and TP (I+5V).
2. Rotate the AMS knob and display “LDPWR ADJUS”.
   (Laser power : For adjustment)
3. Press the YES button twice and display “LD $ 4B = 3.5 m”.
4. Adjust RV102 of the BD board so that the reading of the laser power meter becomes $3.4^{+0.1}_{-0}$ mW.
5. Press the YES button and display “LD $ 96 = 7.0 m”.
   (Laser power : MO writing)
6. Check that the laser power meter and digital voltmeter readings satisfy the specified value.

   Specification :
   Laser power meter reading : 7.0 ± 0.3 mW
   Digital voltmeter reading : Optical pickup displayed value ± 10%

   (Optical pickup label)

   Iop = 82.5 mA in this case
   Iop (mA) = Digital voltmeter reading (mV)/ 1 (Ω)

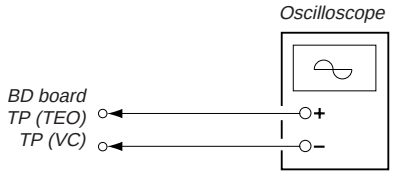
7. Press the YES button and display “LD $ 0F = 0.7 m”.
   (Laser power : MO reading)
8. Check that the laser power meter at this time satisfies the specified value.

   Specification :
   Laser power meter reading : 0.70 ± 0.1 mW

9. Press the NO button and display “LDPWR ADJUS”, and stop laser emission.
   (The NO button is effective at all times to stop the laser emission.)

Traverse Adjustment

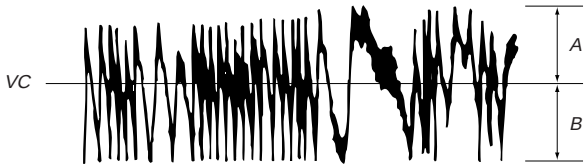
Connection :



Adjusting method :

1. Connect an oscilloscope to TP (TEO) and TP (VC) of the BD board.
2. Load a MO disc (any available on the market).
3. Press the ◀◀ button or ▶▶ button and move the optical pick-up outside the pit.
4. Rotate the AMS knob and display “EFBAL ADJUS”.
5. Press the YES button and display “EFBAL MO-W”.
   (Laser power WRITE power/Focus servo ON/tracking servo OFF/spindle (S) servo ON)
6. Adjust RV101 of the BD board so that the waveform of the oscilloscope becomes the specified value.
   (MO groove write power traverse adjustment)

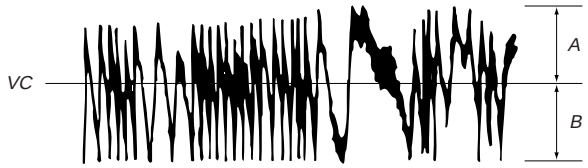
(Traverse Waveform)



Specification A = B

7. Press the YES button and display “EFB = $ □ MO-R”.
   (Laser power : MO reading)
8. Rotate the AMS knob so that the waveform of the oscilloscope becomes the specified value.
   (When the AMS knob is rotated, the □ of “EFB = $ □” changes and the waveform changes.) In this adjustment, waveform varies at intervals of approx. 3%. Adjust the waveform so that the specified value is satisfied as much as possible.
   (MO groove read power traverse adjustment)

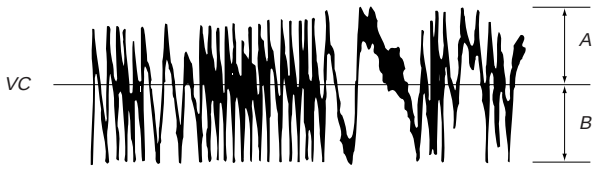
(Traverse Waveform)



Specification A=B

9. Press the YES button, display “EFB = $ □ SAV” for a moment and save the adjustment results in the non-volatile memory.
   Next “EFBAL MO-P” is displayed.
10. Press the YES button and display “EFB = $ □ MO-P”.
    The optical pick-up moves to the pit area automatically and servo is imposed.
11. Rotate the AMS knob until the waveform of the oscilloscope moves closer to the specified value.
    In this adjustment, waveform varies at intervals of approx. 3%. Adjust the waveform so that the specified value is satisfied as much as possible.

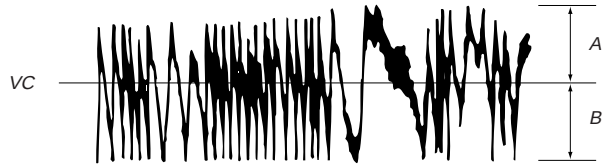
(Traverse Waveform)



Specification A=B

12. Press the YES button, display “EFB = $ □ SAV” for a moment and save the adjustment results in the non-volatile memory.
    Next “EFBAL CD” is displayed. The disc stops rotating automatically.
13. Press the ⏏OPEN/CLOSE button and remove the MO disc.
14. Load the check disc (MD) TDYS-1.
15. Press the YES button and display “EFB = $ □ CD”. Servo is imposed automatically.
16. Rotate the AMS knob so that the waveform of the oscilloscope moves closer to the specified value.
    In this adjustment, waveform varies at intervals of approx. 3%. Adjust the waveform so that the specified value is satisfied as much as possible.

(Traverse Waveform)

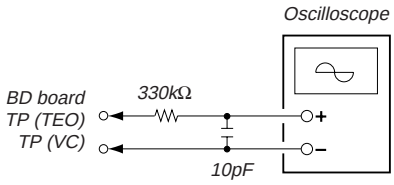


Specification A=B

17. Press the YES button, display “EFB = $ □ SAV” for a moment and save the adjustment results in the non-volatile memory.
    Next “EFBAL ADJUS” is displayed.
18. Press the ⏏OPEN/CLOSE button and remove the test disc TDYS-1.

Note 1 : Data will be erased during MO reading if a recorded disc is used in this adjustment.

Note 2 : If the traverse waveform is not clear, connect the oscilloscope as shown in the following figure so that it can be seen more clearly.



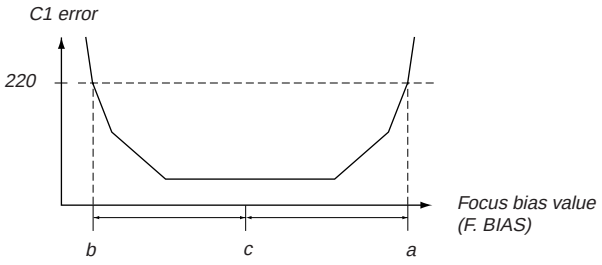
Focus Bias Adjustment

Adjusting Method :

1. Load a continuously recorded disc (Refer to “Page 32 Creating Continuously Recorded Disc”.).
2. Rotate the AMS knob and display “CPLAY MODE”.
3. Press the YES button twice and display “CPLAY MID”.
4. Press the NO button when “C1 = □□□□ AD = □□” is displayed.
5. Rotate the AMS knob and display “FBIAS ADJUS”.
6. Press the YES button and display “ □□□□/□□ a = □□”.
   The first four digits indicate the C1 error rate, the two digits after [/] indicate ADER, and the 2 digits after [a =] indicate the focus bias value.
7. Rotate the AMS knob in the clockwise direction and find the focus bias value at which the C1 error rate becomes 220.
8. Press the YES button and display “ □□□□/□□ b = □□”.
9. Rotate the AMS knob in the counterclockwise direction and find the focus bias value at which the C1 error rate becomes 220.
10. Press the YES button and display “ □□□□/□□ c = □□”.
11. Check that the C1 error rate is below 50 and ADER is 00. Then press the YES button.
12. If the “(□□” in “□□ - □□ - □□ (□□” is above 20, press the YES button.
    If below 20, press the NO button and repeat the adjustment from step 2 again.
13. Press the NO button and press the ⏏OPEN/CLOSE button to remove the continuously recorded disc.

Note 1 : The relation between the C1 error and focus bias is as shown in the following figure. Find points a and b in the following figure using the above adjustment. The focal point position C is automatically calculated from points a and b.

Note 2 : As the C1 error rate changes, perform the adjustment using the average value.



Error Rate Check

CD Error Rate Check

Checking Method :

1. Load a check disc (MD) TDYS-1.
2. Rotate the AMS knob and display “CPLAY MODE”.
3. Press the YES button twice and display “CPLAY MID”.
4. “C1 = □□□□ AD = □□” is displayed.
5. Check that the C1 error rate is below 20.
6. Press the NO button, stop playback, press the ⏏OPEN/CLOSE button, and remove the test disc.

MO Error Rate Check

Checking Method :

1. Load a continuously recorded disc (Refer to “Page 32 Creating Continuously Recorded Disc”.).
2. Rotate the AMS knob and display “CPLAY MODE”.
3. Press the YES button twice and display “CPLAY MID”.
4. “C1 = □□□□ AD = □□” is displayed.
5. If the C1 error rate is below 50, check that ADER is 00.
6. Press the NO button, stop playback, press the ⏏OPEN/CLOSE button, and remove the continuously recorded disc.

Focus Bias Check

Change the focus bias and check the focus tolerance amount.

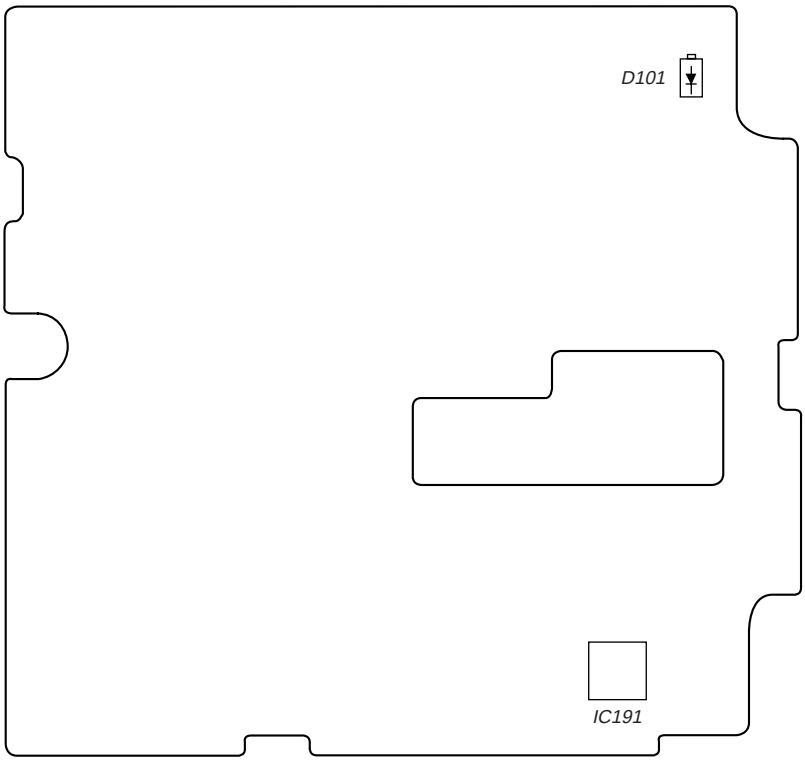
Checking Method :

1. Load a continuously recorded disc (Refer to “Page 32 Creating Continuously Recorded Disc”.).
2. Rotate the AMS knob and display “CPLAY MODE”.
3. Press the YES button twice and display “CPLAY MID”.
4. Press the NO button when “C1 = □□□□ AD = □□” is displayed.
5. Rotate the AMS knob and display “FBIAS CHECK”.
6. Press the YES button and display “ □□□□/□□ c = □□”.
   The first four digits indicate the C1 error rate, the two digits after [/] indicate ADER, and the 2 digits after [c =] indicate the focus bias value.
   Check that the C1 error is below 50 and ADER is 00.
7. Press the YES button and display “ □□□□/□□ b = □□”.
   Check that the C1 error is not below 220 and ADER is not above 00 every time.
8. Press the YES button and display “ □□□□/□□ a = □□”.
   Check that the C1 error is not below 220 and ADER is not above 00 every time.
9. Press the NO button, next press the ⏏OPEN/CLOSE button, and remove the continuously recorded disc.

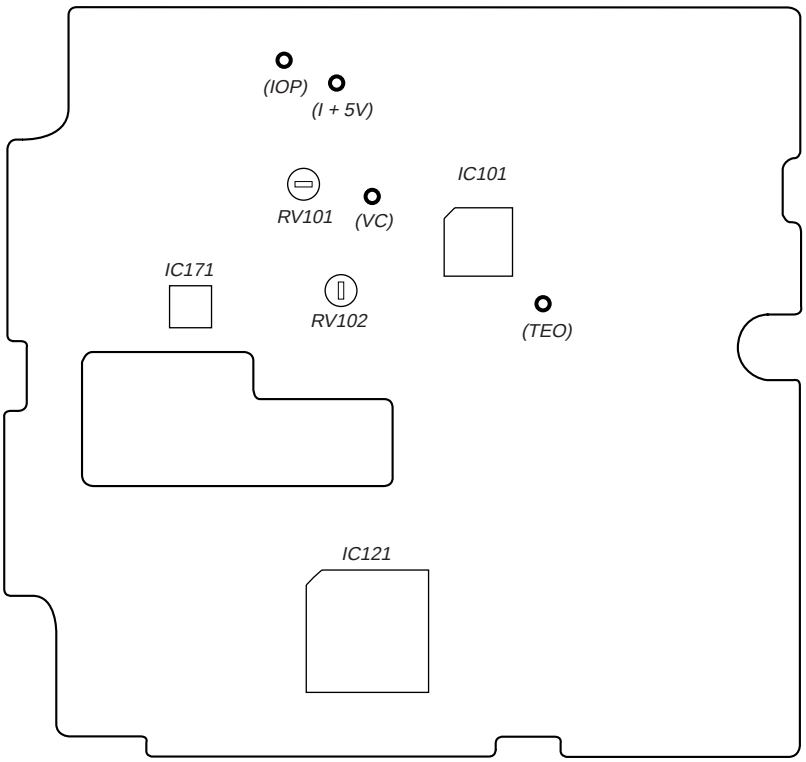
Note 1 : If the C1 error and ADER are above 00 at points a or b, the focus bias adjustment may not have been carried out properly. Adjust perform the beginning again.

Adjusting Points and Connecting Points

[BD BOARD] (SIDE A)

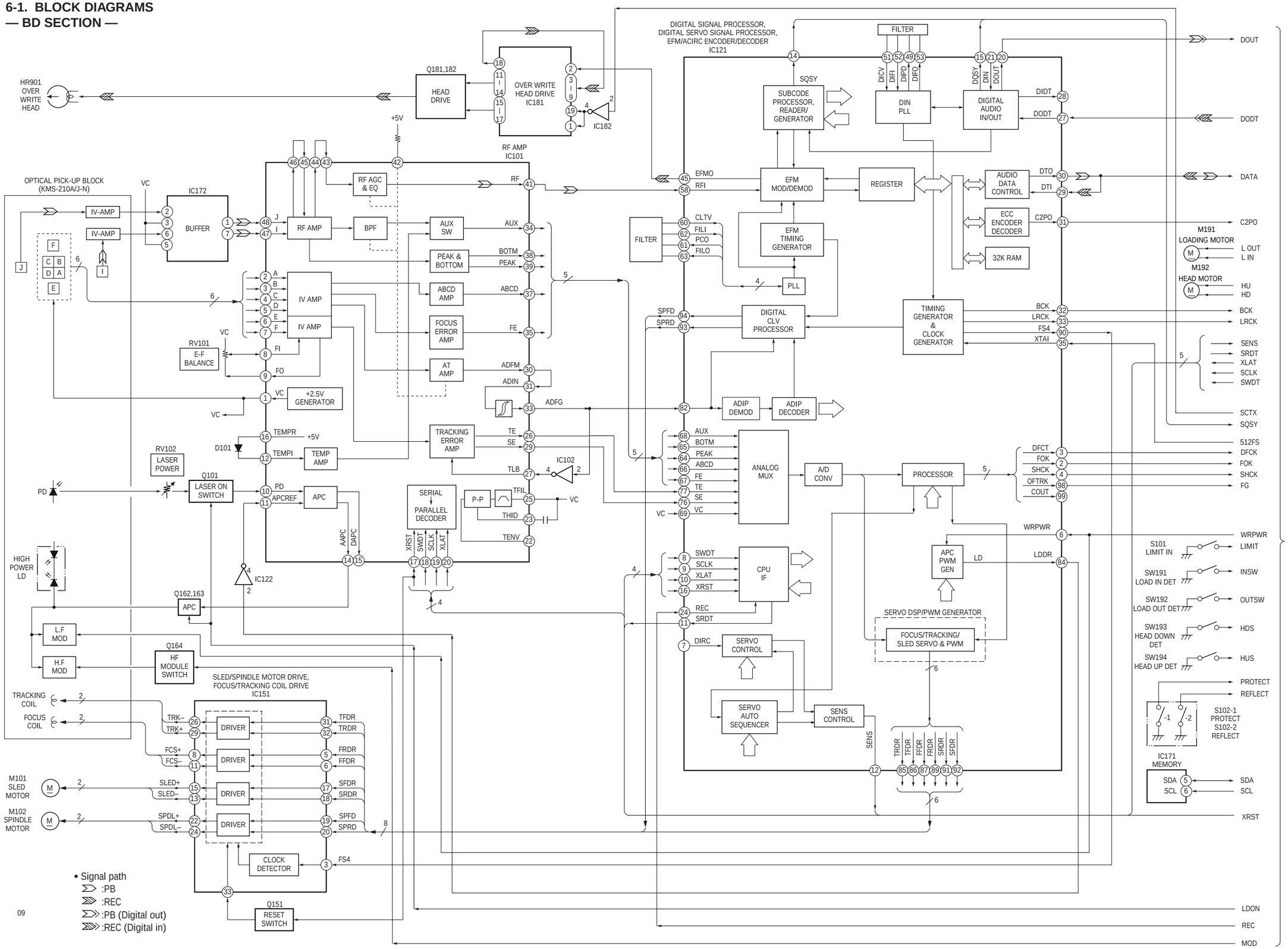


[BD BOARD] (SIDE B)



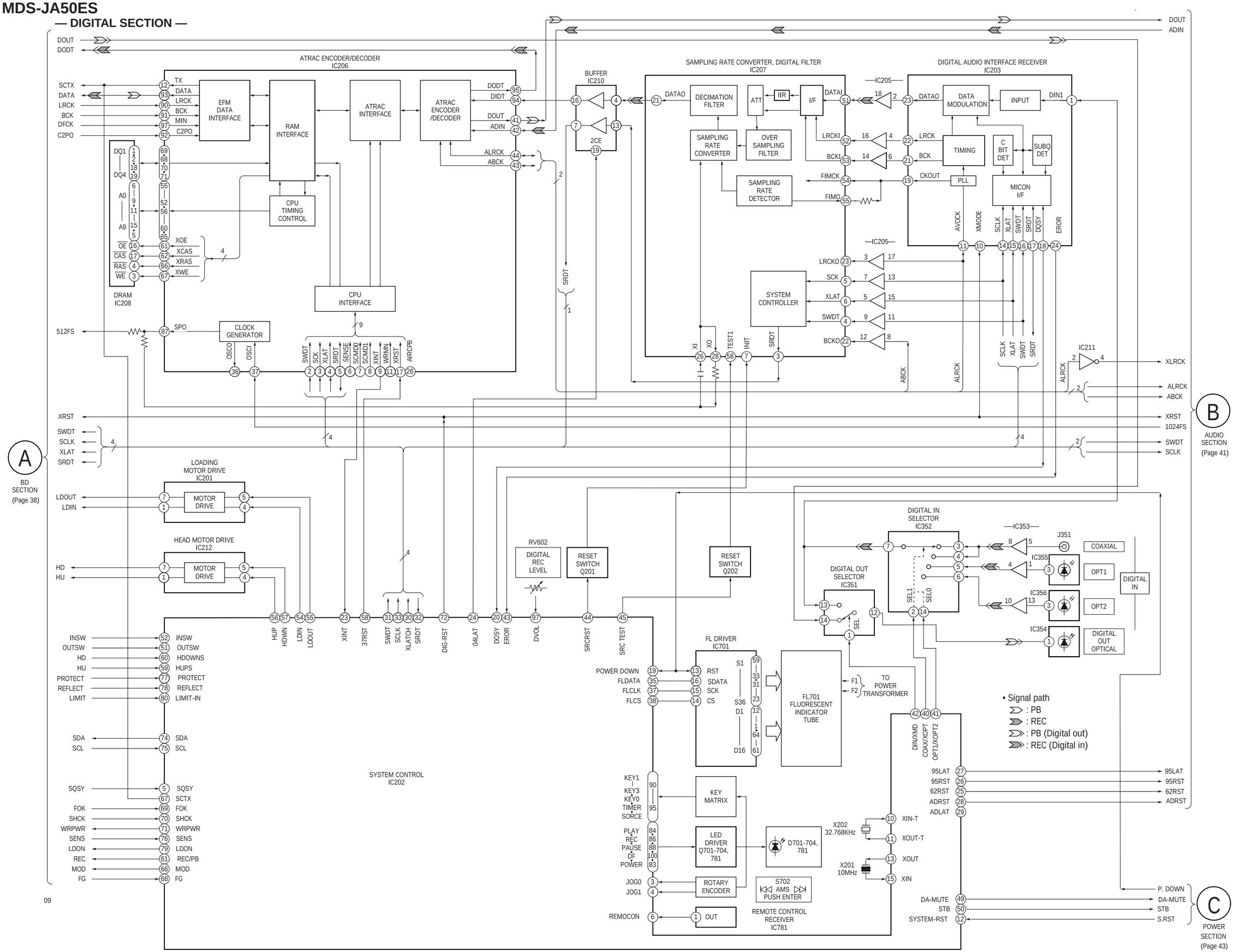
SECTION 6
DIAGRAMS

6-1. BLOCK DIAGRAMS
— BD SECTION —

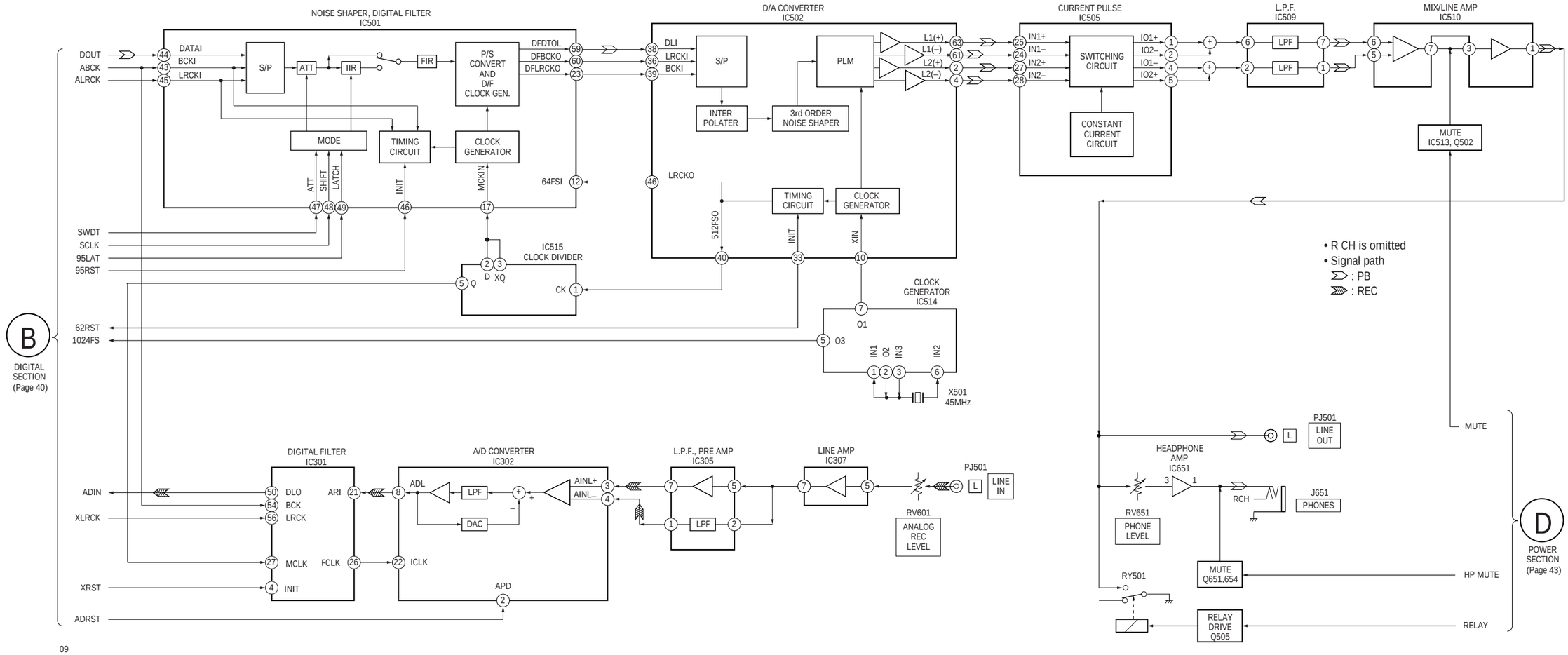


MDS-JA50ES

— DIGITAL SECTION —

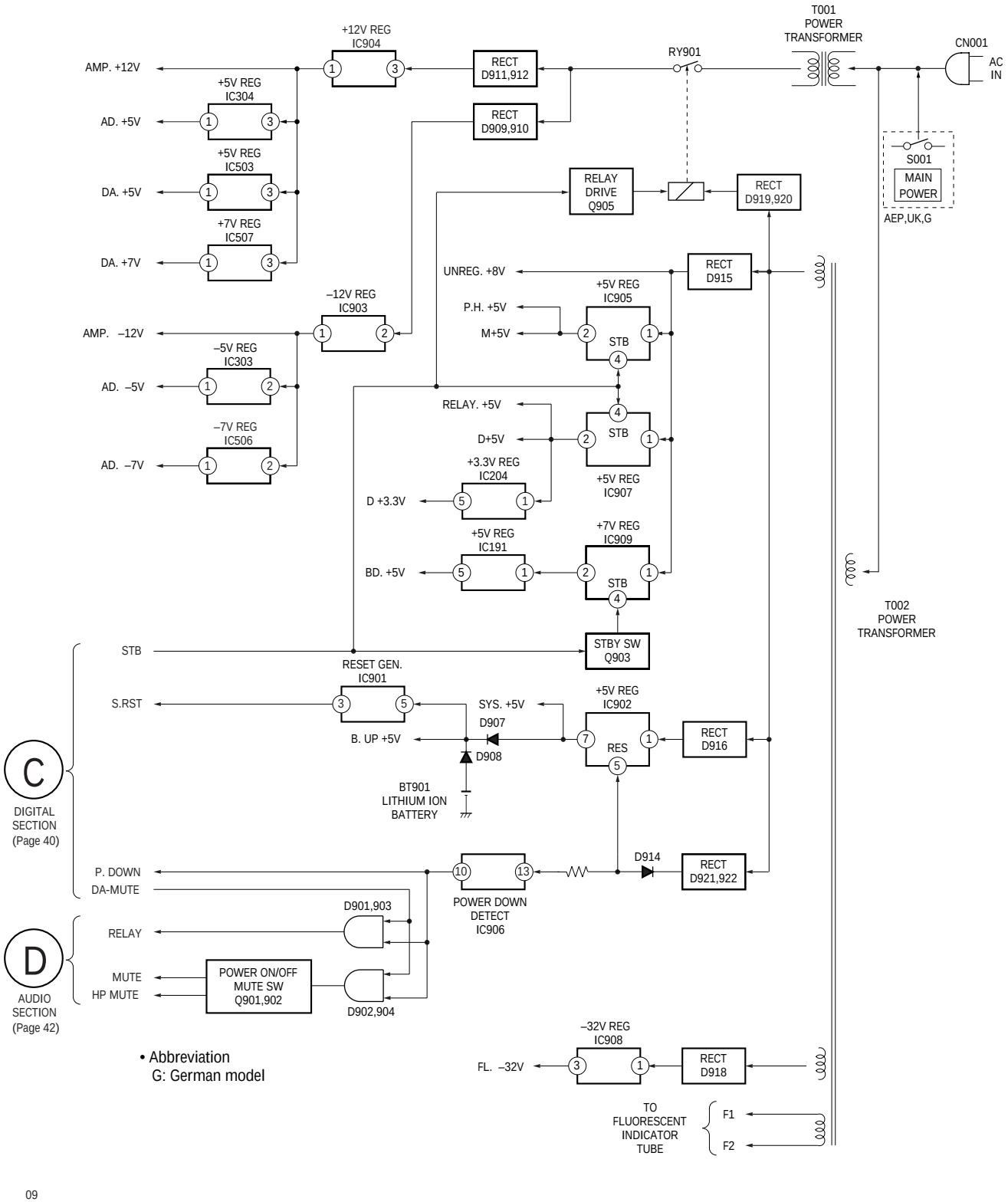


— AUDIO SECTION —



09

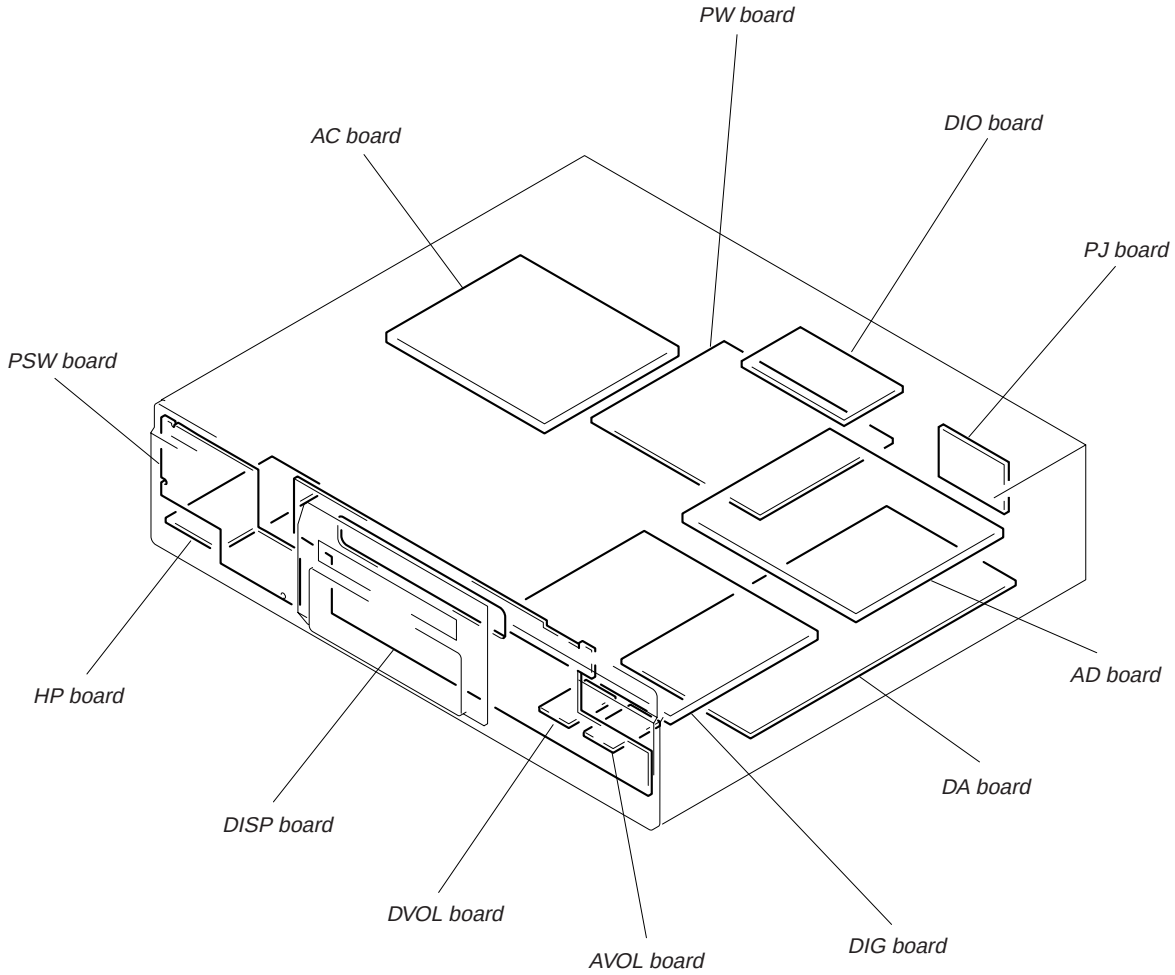
— POWER SECTION —

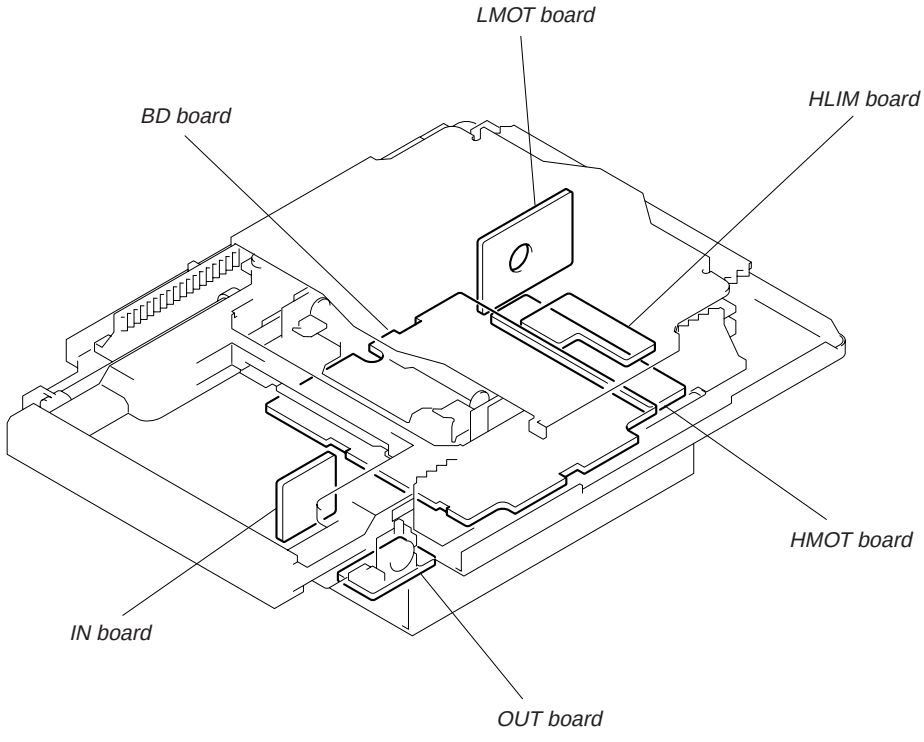


• Abbreviation
G: German model

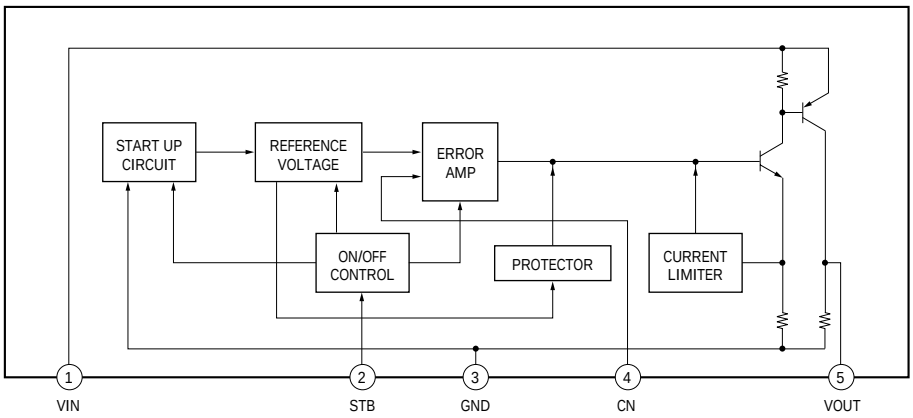
09

6-2. CIRCUIT BOARDS LOCATION

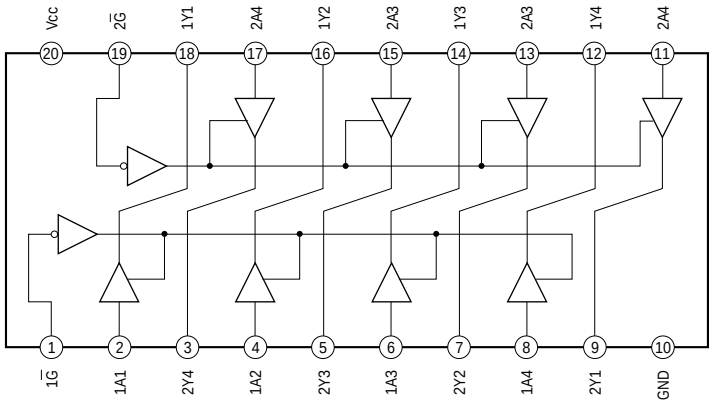




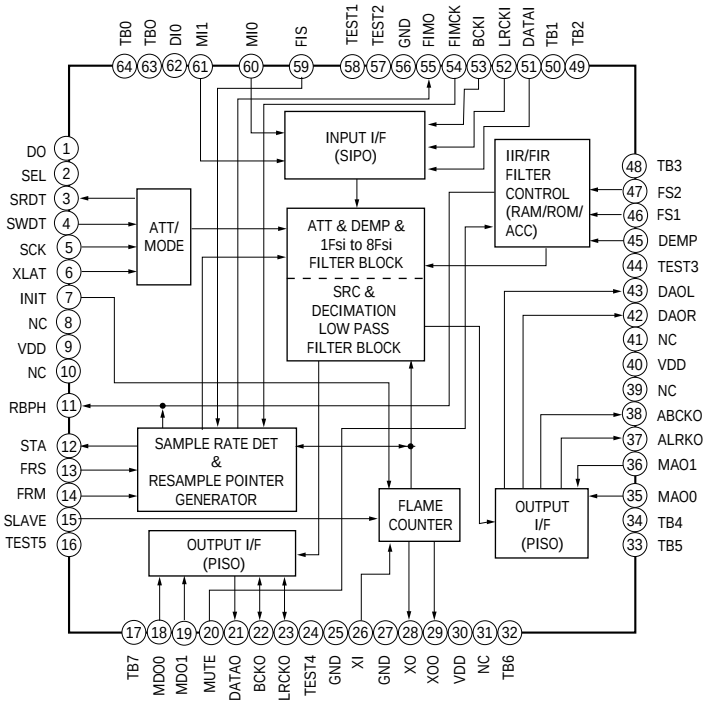
IC204 L88MS33T-TL



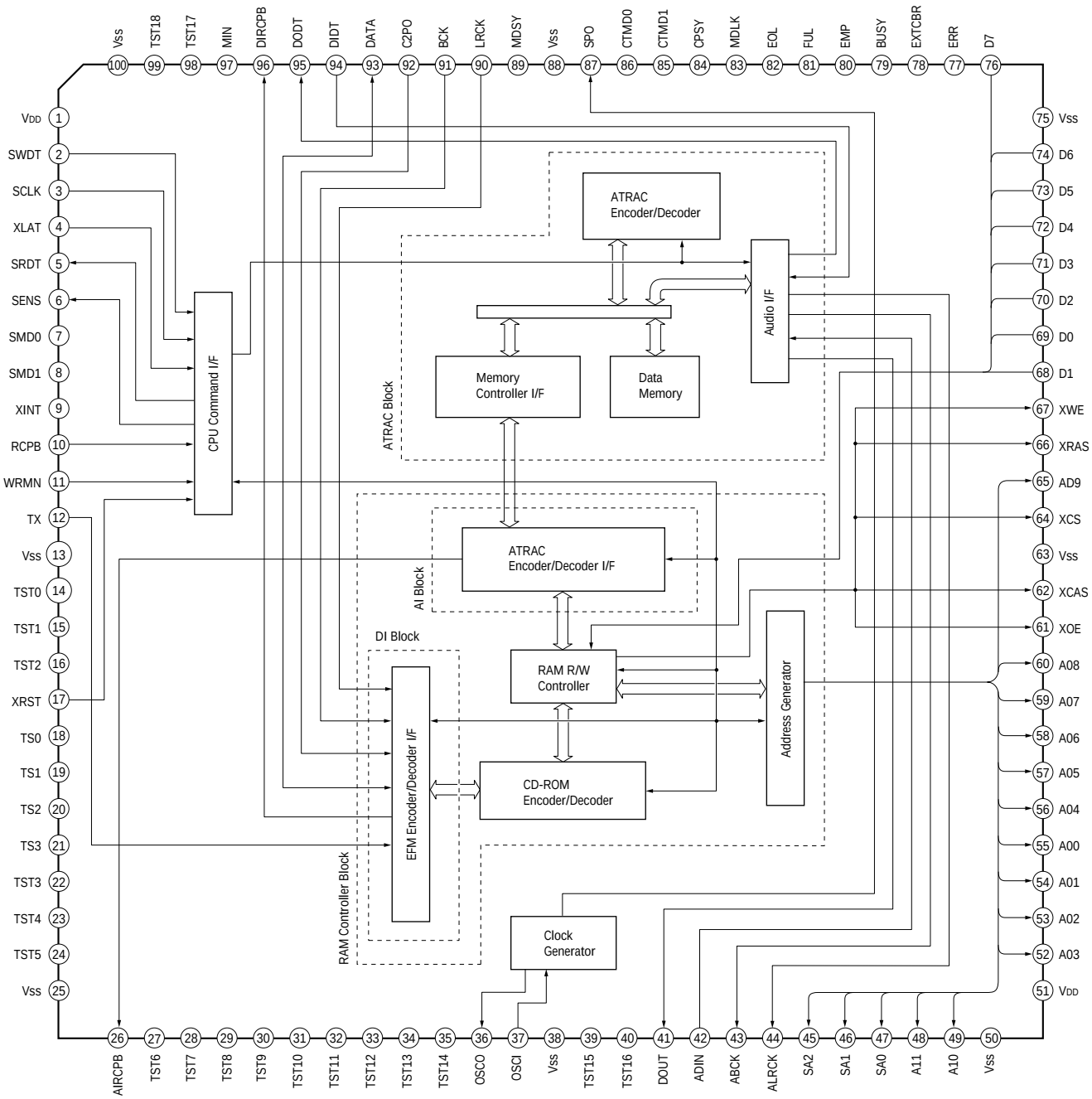
IC205 TC74LCX244FS (EL)
IC210 TC74VHCT244F (EL)



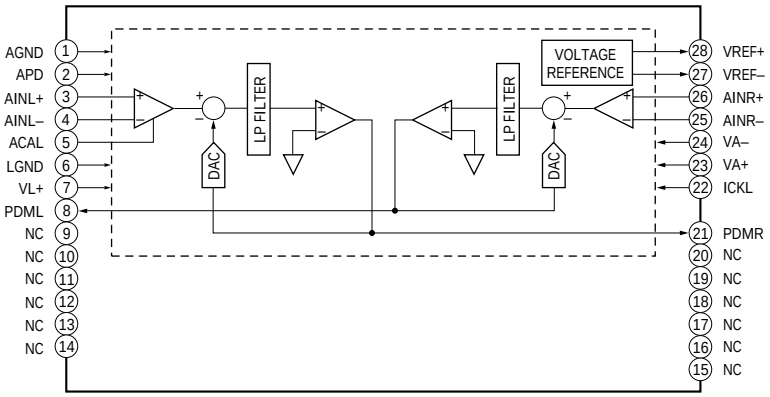
IC207 MSM9404AGS-BK



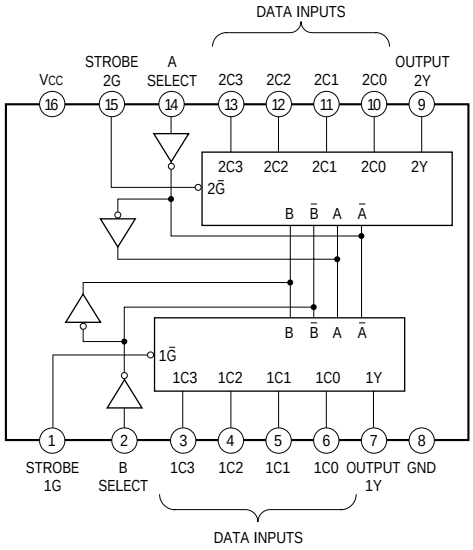
IC206 CXD2537R



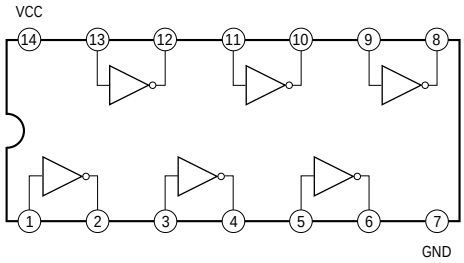
IC302 CXD8593M-E1



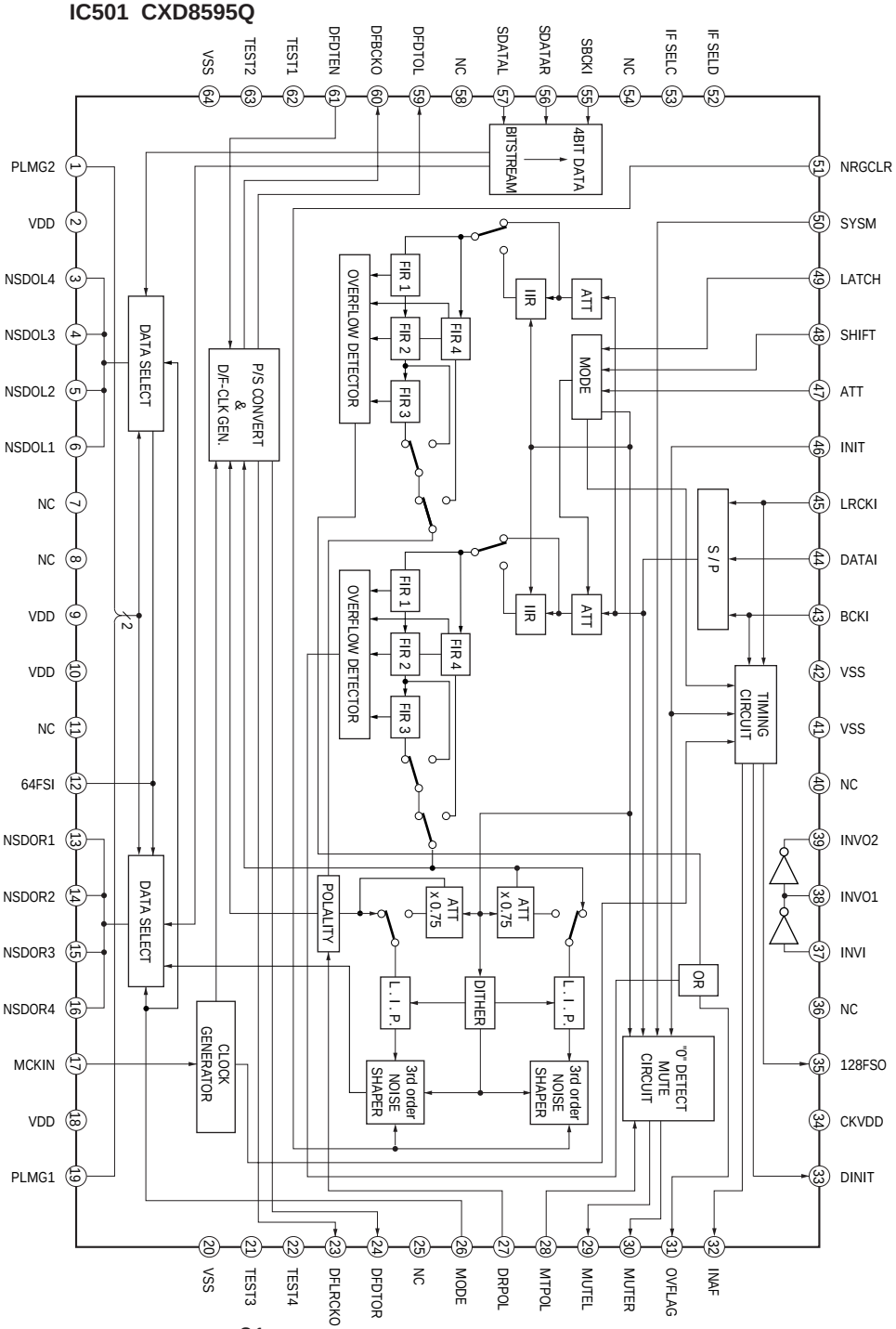
IC352 SN74HC153ANS-E20



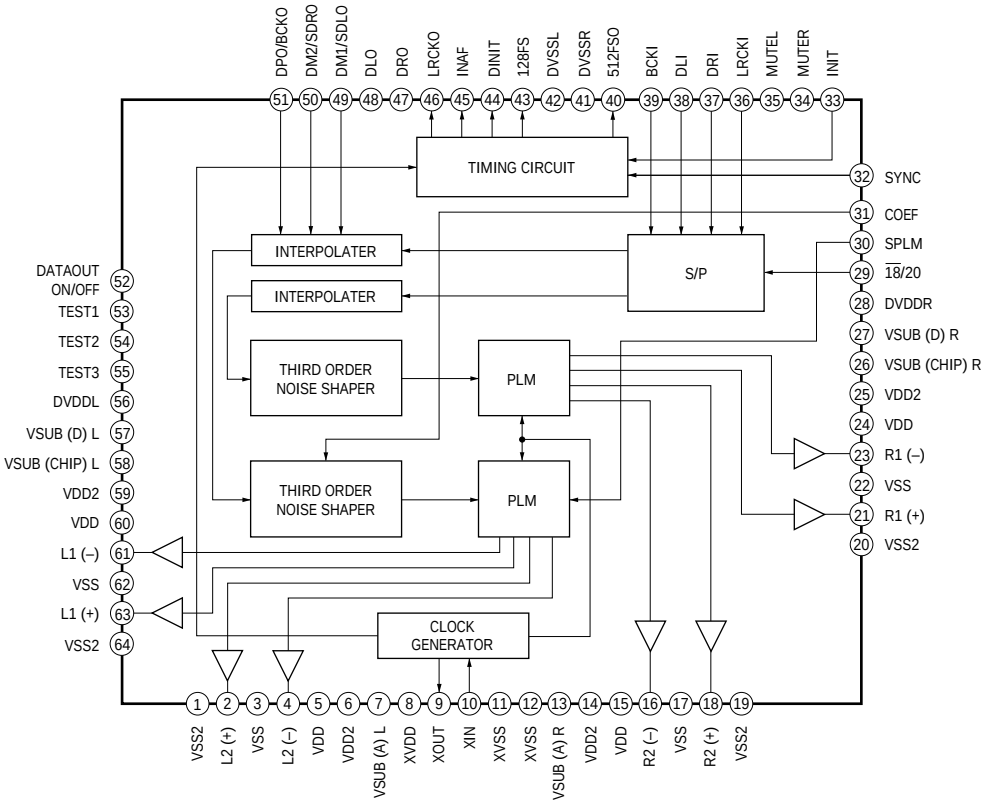
IC353 SN74HCU04ANS-E20



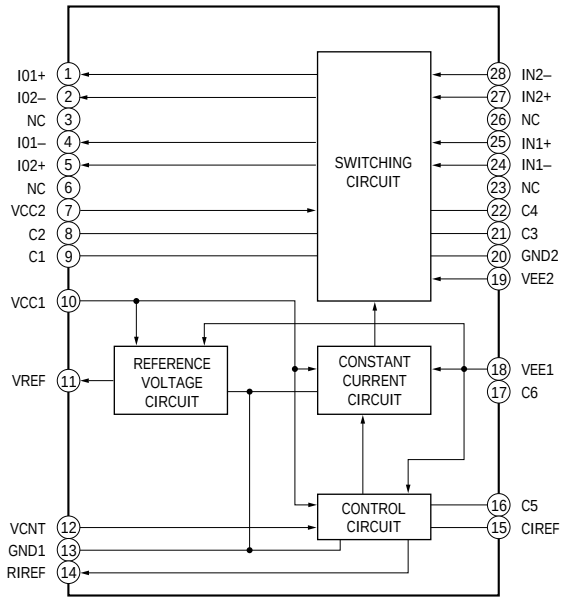
IC501 CXD8595Q



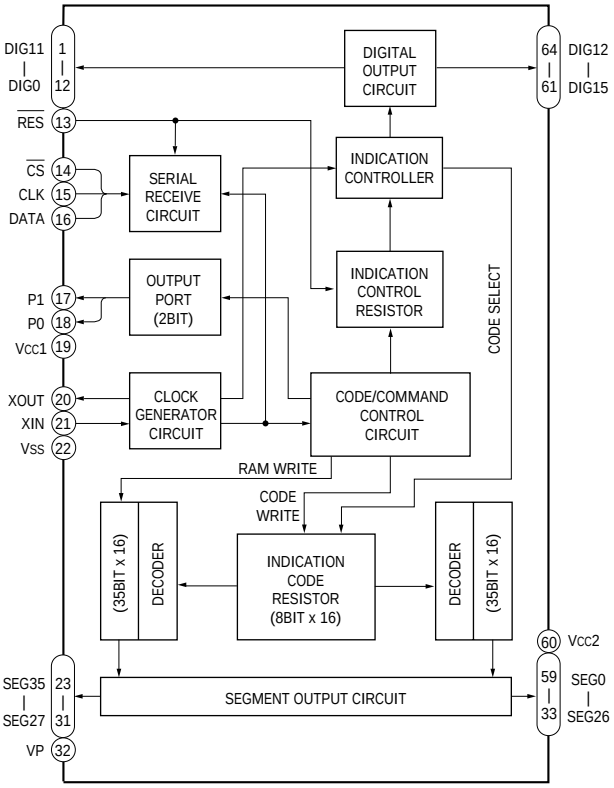
IC502 CXD2562Q-CS



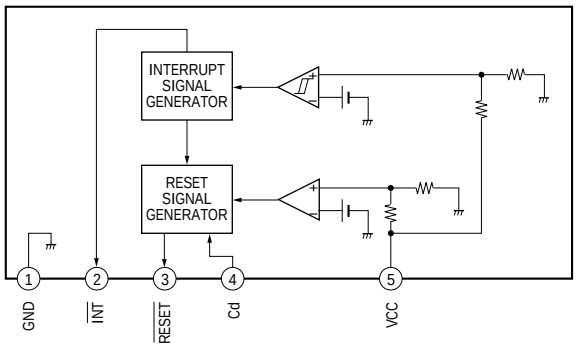
IC504, 505 CXA8042AS



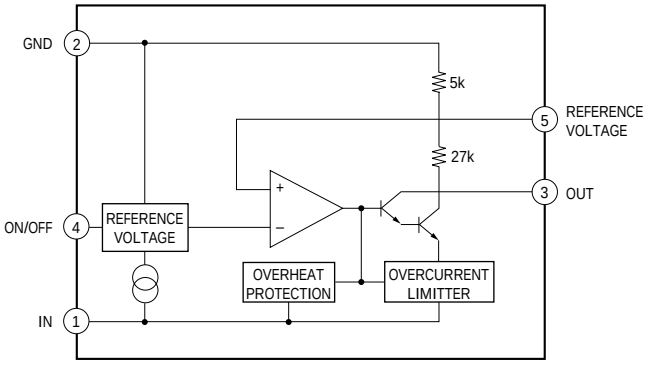
IC701 M66004M8FP



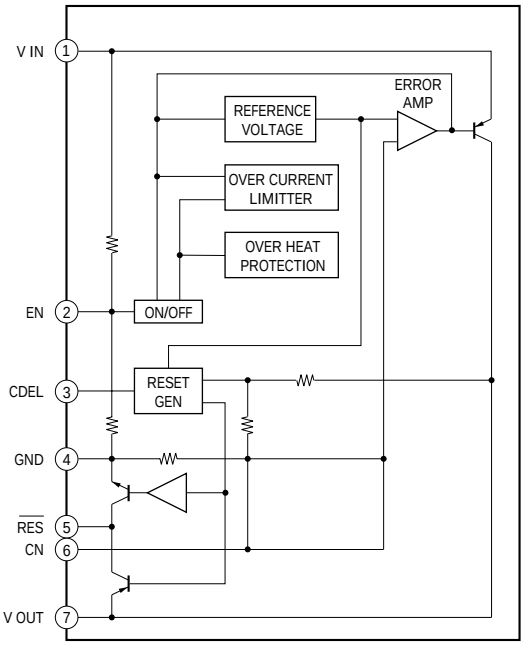
IC901 M62005L



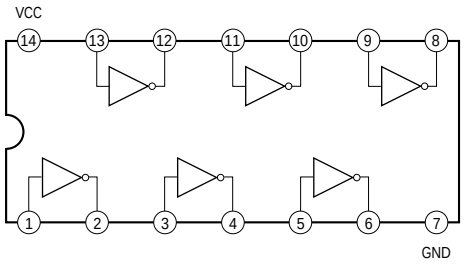
IC908 M5293L



IC902 LA5602



IC906 SN74HC04ANS-E20



6-21. IC PIN FUNCTIONS

• IC101 RF Amplifier (CXA1981AR)/BD board

Pin No.	Pin Name	I/O	Function
1	VC	O	Middle point voltage (+2.5V) generation output
2 to 7	A to F	I	Input of signal from optical pick-up detector
8	FI	I	F operation amplifier input
9	FO	O	F operation amplifier output
10	PD	I	Front monitor Connected to photo diode
11	APCREF	I	Input for setting laser power
12	TEMPI	I	Temperature sensor connection pin
13	GND	—	Ground
14	AAPC	O	APC LD amplifier output
15	DAPC	O	Digital APC output (Not used)
16	TEMPR	O	Temperature sensor reference voltage output
17	XRST	I	Input of reset signal from system controller Reset: “L”
18	SWDT	I	Input of write data signal from system controller
19	SCLK	I	Input of clock signal from system controller
20	XLAT	I	Input of latch signal from system controller
21	VREF	O	Reference voltage output (Not used)
22	TENV	O	Tracking envelop signal output (Not used)
23	THLD	I	Track hold capacitor connection pin
24	VCC	—	Power supply (+5V)
25	TFIL	I	Track hold input (Connected to VC)
26	TE	O	Output of tracking error signal to CXD2535CR
27	TLB	I	Input of add signal to tracking error
28	CSLED	I	Sled error LPF pin
29	SE	O	Output of sled error signal to CXD2535CR
30	ADFM	O	ADIP FM signal output
31	ADIN	I	Inputs ADIP FM signal by AC coupling
32	ADAGC	I	Connection pin of external capacitor for ADIP AGC
33	ADFG	O	Output of ADIP dual FM signal to CXD2535CR (22.05 kHz±1 kHz)
34	AUX	O	Output of auxiliary signal to CXD2535CR
35	FE	O	Output of focus error signal to CXD2535CR
36	FLB	I	Focus bias control input (Not used)
37	ABCD	O	Output of light amount signal to CXD2535CR
38	BOTM	O	Output of bottom hold signal of light amount signal to CXD2535CR
39	PEAK	O	Output of peak hold signal of light amount signal to CXD2535CR
40	RFAGC	I	Connection pin of RF AGC circuit external capacitor
41	RF	O	Output of playback EFM RF signal to CXD2535CR
42	ISET	I	Internal circuit constant setting pin 22 kHz BPF center frequency (Fixed at “H”)
43	AGCT	I	Inputs RF signal by AC coupling
44	RFO	O	Output pin of RF signal
45	MORFI	I	Inputs MO RF signal by AC coupling
46	MORFO	O	Output pin of MO RF signal
47, 48	I, J	I	Input of signal from optical pick-up detector

• **IC121 Digital Signal Processor, Digital Servo Processor, EFM/ACIRC Encoder/Decoder (CXD2535CR)/BD board**

Pin No.	Pin Name	I/O	Function
1	FS256	O	11.2896 MHz clock output (MCLK) (Not used)
2	FOK	O	Output of FOK signal to system controller Outputs “H” when focus is set
3	DFCT	O	Outputs defect ON/OFF switching signal to ATRAC encoder/decoder
4	SHCK	O	Outputs track jump detection signal to system controller
5	SHCKEN	I	Track jump detection enable input (Not used) (Fixed at “H”)
6	WRPWR	I	Inputs laser power switching signal from system controller
7	DIRC	I	Disc drive recording/playback switching signal input (Fixed at “H”)
8	SWDT	I	Inputs write data signal from system controller
9	SCLK	I	Inputs serial clock signal from system controller
10	XLAT	I	Inputs serial latch signal from system controller
11	SRDT	O	Outputs read data signal to system controller
12	SENS	O (3)	Outputs internal status (SENSE) to system controller
13	ADSY	O	ADIP sync signal output (Not used)
14	SQSY	O	Output subcode Q sync (SCOR) to system controller Outputs “L” every 13.3 msec Outputs “H” at all most mostly
15	DQSY	O	Outputs digital-in U-bit CD format subcode Q sync (SCOR) to system controller Outputs “L” every 13.3 msec Outputs “H” at all most mostly
16	XRST	I	Inputs reset signal from system controller Reset: “L”
17	TEST4	I	Test input (Fixed at “L”)
18	CLVSCK	O	Not used
19	TEST5	I	Test input (Fixed at “L”)
20	DOUT	O	Digital audio signal output (For optical output)
21	DIN	I	Digital audio signal input (For optical input) (Not used)
22	FMCK	O	ADIP FM demodulation clock signal output
23	ADER	O	ADIP CRC flag output “H”:Error
24	REC	I	Input of recording/playback switching signal from system controller Recording: “H” Playback: “L”
25	DVSS	—	Ground (Digital)
26	DOVF	I	Digital audio output validity flag input (Fixed at “L”)
27	DODT	I	Input of 16bit data for digital audio output
28	DIDT	O	Output of 16bit data for digital audio input to ATRAC encoder/decoder
29	DTI	I	Input of recording audio data signal from ATRAC encoder/decoder
30	DTO	O (3)	Output of playback audio data signal to ATRAC encoder/decoder
31	C2PO	O	Outputs C2PO signal to ATRAC encoder/decoder (Output indicating data error status) Playback: C2PO (“H”) Digital recording: Digital-in-Vflag Analog recording: “L”
32	BCK	O	Outputs bit clock signal (2.8224 MHz) (MCLK)
33	LRCK	O	Outputs L/R clock signal (44.1 kHz) (MCLK)
34	XTAO	O	System clock (512 fs=22.5792 MHz) signal output
35	XTAI	I	Input of system clock (512fs=22.5792 MHz) signal input
36	MCLK	O	MCLK clock (22.5792 MHz) signal output (Not used)
37	XBCK	O	Pin 32 (BCK) inversion output (Not used)
38	DVDD	—	Power supply (+5V) (Digital)
39	WDCK	O	WDCK clock (88.2 kHz) signal output (MCLK)
40	RFCK	O	RFCK clock (7.35 kHz) signal output (MCLK)

Pin No.	Pin Name	I/O	Function
41	WFCK	O	WFCK clock (7.35 kHz) signal output (Playback: EFM decoder PLL Recording: EFM encoder PLL)
42	GTOP	O	"H": Opens playback EFM frame sync protection window
43	GFS	O	"H": Playback EFM sync and interpolation protection timing match
44	XPLCK	O	EFM decoder PLL clock output (98 fs=4.3218 MHz) Falling edge and EFM signal edge match
45	EFMO	O	EFM signal output (Recording)
46	RAOF	O	Internal RAM overflow detection signal output (decoder monitor output) Outputs "H" when the disc rotation exceeds ±4F jitter margin during playback
47	MVCI	I	Digital-in PLL oscillation input (Not used) (Fixed at "L")
48	TEST2	I	Test pin (Fixed at "L")
49	DIPD	O (3)	Digital-in PLL phase comparison output Internal VCO: (Frequency: Low ⟶ "H") External VCO: (Frequency: Low ⟶ "L")
50	DVSS	—	Ground (Digital)
51	DICV	I (A)	Digital-in PLL internal VCO control voltage input
52	DIFI	I (A)	Filter input when digital-in PLL internal VCO is used
53	DIFO	O (A)	Filter output when digital-in PLL internal VCO is used (Not used)
54	AVDD	—	Power supply (+5V) (Analog)
55	ASYO	O	Playback EFM full-swing output (L=VSS, H=VDD)
56	ASYI	I (A)	Playback EFM asymmetry comparate voltage input
57	BIAS	I (A)	Playback EFM asymmetry circuit constant current input
58	RFI	I (A)	Inputs playback EFM RF signal from RF amplifier
59	AVSS	—	Ground (Analog)
60	CLTV	I (A)	Decoder PLL master clock PLL VCO control voltage input
61	PCO	O (3)	Decoder PLL master clock PLL phase comparison output
62	FILI	I (A)	Decoder PLL master clock PLL filter input
63	FILO	O (3)	Decoder PLL master clock PLL filter output
64	PEAK	I (A)	Inputs peak hold signal for light amount signal from RF amplifier
65	BOTM	I (A)	Inputs bottom hold signal for light amount signal from RF amplifier
66	ABCD	I (A)	Light amount signal from RF amplifier
67	FE	I (A)	Input of focus error signal from RF amplifier
68	AUX1	I (A)	Input of auxiliary signal from RF amplifier
69	VC	I (A)	Input of middle point voltage (+2.5V) from RF amplifier
70	ADIO	O (A)	A/D converter input signal monitor output
71	TEST3	I (A)	Test input (Fixed at "L")
72	AVDD	—	Power supply (+5V) (Analog)
73	ADRT	I (A)	A/D converter operation range upper limit voltage input (Fixed at "H")
74	ADRB	I (A)	A/D converter operation range lower limit voltage input (Fixed at "L")
75	AVSS	—	Ground (Analog)
76	SE	I (A)	Input of sled error signal from RF amplifier
77	TE	I (A)	Input of tracking error signal from RF amplifier
78	AUX2	I (A)	Auxiliary input pin 2 (Fixed at "L")
79	DCHG	I (A)	Connected to ground
80	APC	I (A)	Laser APC input (Fixed at "L")

• Abbreviation
EFM : Eight to Fourteen Modulation
PLL : Phase Locked Loop

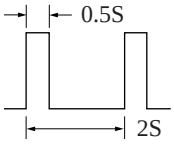
Pin No.	Pin Name	I/O	Function
81	TEST1	I	Test pin (Fixed at “L”)
82	ADFG	I	Input of ADIP dual FM signal from RF amplifier (22.05 kHz ±1 kHz) (TTL Schmidt input)
83	TS25	I	Test pin (Fixed at “L”)
84	LDDR	O	Laser APC signal output
85	TRDR	O	Tracking servo drive signal output (–)
86	TFDR	O	Tracking servo drive signal output (+)
87	FFDR	O	Focus servo drive signal output (+)
88	DVDD	—	Power supply (+5V) (Digital)
89	FRDR	O	Focus servo drive signal output (–)
90	FS4	O	176.4 kHz clock signal output (MCLK) (Not used)
91	SRDR	O	Sled servo drive signal output (–)
92	SFDR	O	Sled servo drive signal output (+)
93	SPRD	O	Spindle servo drive signal output (–)
94	SPFD	O	Spindle servo drive signal output (+)
95	DCLO	O	Not used normally
96	DCLI	I	Not used normally (Fixed at “H”)
97	XDCL	O	Not used normally
98	OFTRK	O	Off track signal output (Not used)
99	COUT	O	Traverse count signal output (Not used)
100	DVSS	—	Ground (Digital)

* (3) of I/O is 3-state output, (A) is analog output.

• IC202 System Controller (M30610EC-1086FP)/DIG board

Pin No.	Pin Name	I/O	Function
1, 2	—	—	Not used
3	JOG0	I	AMS jog signal input
4	JOG1	I	
5	SQSY	I	ATP address sync or sub code Q sync (SCOR) input from CXD2535CR "L" is input every 13.3 msec Mainly "H"
6	REMOCON	I	Remote control signal interruption input
7	—	—	Not used
8	BYTE	I	Data bus switching signal input "L":Single chip mode (Fixed at "L")
9	CNVSS	—	Ground
10	XIN-T	I	Sub clock input (37.768 kHz)
11	XOUT-T	O	Sub clock output (32.768 kHz)
12	SYSTEM-RST	I	System reset input "L":Reset
13	XOUT	O	Main clock output (10 MHz)
14	GND	—	Ground
15	XIN	I	Main clock input (10 MHz)
16	+5V	—	Power supply (+5V)
17	MNI	I	Not used
18	—	—	
19	POWER DOWN	I	Power down detection signal input "L":Power down
20	DQSY	I	Digital-in U-bit CD format sub code Q sync (SCOR) input from CXD2535CR "L" is input every 13.3 msec Mainly "H"
21, 22	—	—	Not used
23	XINT	I	Interruption status input from ATRAC encoder/decoder
24	04LAT	O	Data read signal output to sampling rate converter, digital filter "L":Active
25	62RST	O	Reset signal output to D/A converter "L":Reset
26	95RST	O	Reset signal output to CXD8595Q "L":Reset
27	95LAT	O	Transmission data latch signal output to CXD8595Q
28	ADRST	O	Reset signal output to A/D converter "H":Reset
29	ADLAT	O	Latch signal output to A/D converter
30	XLATCH	O	Serial data latch signal output
31	SWDT	O	Write data signal input to serial bus
32	SRDT	I	Read data signal input from serial bus
33	SCLK	O	Clock signal output to serial bus
34	—	—	Not used
35	FLDATA	O	Transmission data clock output to FL driver
36	—	—	Not used
37	FLCLK	O	Transmission data clock output to FL driver
38	FLCS	O	Transmission data chip select output to FL driver
39	—	—	Not used
40	COAX/XOPT	O	Digital-in select signal output "L":Optical input, "H":Coaxial input
41	OPT1/XOPT2	O	Digital-in select signal output "L":OPT2, "H":OPT1
42	DIN/XMD	O	Digital-out select signal output "L":MD, "H":Digital in through
43	EROR	I	Digital-in error signal input
44	SRCRST	O	Reset signal output to sampling rate converter, digital filter "L":Reset

• Abbreviation
FL : Fluorescent indicator tube

Pin No.	Pin Name	I/O	Function
45	SRC TEST	O	The second reset signal output from sampling rate converter
46 to 48	—	—	Not used
49	DAMUTE	O	D/A line mute output "L":Active
50	STB	O	Strobe signal output to power supply circuit When power is ON:"H", When standby:"L"
51	OUTSW	I	Detection input from loading out detection switch
52	INSW	I	Detection input from loading in detection switch
53	—	—	Not used
54	LDIN	O	Loading motor control output
55	LDOUT	O	
56	HUP	O	Magnetic head up/down control output
57	HDWN	O	
58	37RST	O	Reset signal output to ATRAC encoder/decoder "L":Reset
59	HUPS	I	Detection input from magnetic head up detection switch
60	HDOWNS	I	Detection input from magnetic head down detection switch
61	REC/PB	O	Recording/playback selection signal output to CXD2535CR When recording:"H", when playing back:"L"
62	VCC	—	Power supply (+5V)
63	—	—	Not used
64	VSS	—	Ground
65	—	—	Not used
66	MOD	O	Laser modulation switching signal output During playback power: "L", During stop:"H" During recording power: 
67	SCTX	O	Write data transmission timing output to ATRAC encoder/decoder Used also as magnetic head ON/OFF output
68	FG	I	FG detection signal output from spindle motor driver
69	FOK	I	FOK signal input from CXD2535CR "H" is input when focus is set
70	SHCK	I	Track jump detection signal input from CXD2535CR
71	WRPWR	O	Laser power switching signal output to optical pick-up and CXD2535CR
72	DIG-RST	O	Digital reset signal output
73	—	—	Not used
74	SDA	I/O	Input/output of data signal with EEPROM
75	SCL	O	Clock signal output to EEPROM
76	SENS	I	Internal status (SENSE) input from CXD2535CR
77	PROTECT	I	Recording prevention tab detection input from protect detection switch When protect is ON:"H"
78	REFLECT	I	Disc reflection rate detection input from reflect detection switch When low reflection rate disc is used:"H"
79	LDON	O	Laser ON/OFF control output "H":Laser ON
80	LIMIT-IN	I	Detection input from limit-in switch When sled limit in:"L"

Pin No.	Pin Name	I/O	Function
81	CSET0	I	Destination setting pin
82	CSET1	I	
83	POWER	O	POWER LED drive output
84	PLAY	O	PLAY (►) LED drive output
85	—	—	Not used
86	REC	O	REC (●) LED drive output
87	—	—	Not used
88	PAUSE	O	PAUSE (❚❚) LED drive output
89	—	—	Not used
90	KEY1	I	Key input (A/D)
91	KEY2	I	
92	KEY3	I	
93	KEY0	I	
94	TIMER	I	Timer recording/playback/OFF switching input “L”:Playback, “H”:Recording, “M”:OFF
95	SORCE	I	Input signal (analog/digital input) selection signal input
96	AVSS(AGND)	—	Analog ground
97	DVOL	I	Digital input level volume input (A/D)
98	VREF(+5V)	I	A/D reference voltage input (+5V)
99	AVCC	—	Analog power supply (+5V)
100	DF	O	FILTER LED drive output

• IC203 Digital Audio Interface Receiver (LC89051V-TLM)/DIG board

Pin No.	Pin Name	I/O	Function
1	DIN1	I	Data input with built-in amplifier (responding to the coaxial optical module)
2	DIN2	I	Data input (responding to the optical module) (Not used)
3	E/DOUT	O	Emphasis, input bi-phase, validity flag output (Not used)
4	VDD	—	Power supply (+5V)
5	R	I	VCO gain control input
6	VIN	I	VCO freerunning frequency setting input
7	VCO	O	LPF setting of PLL
8	GND	—	Ground
9	CKSEL	I	System clock select input (384fs, 512fs) (Fixed at “H”)
10	XMODE	I	Reset input
11	AVOCK	I	Clock input for preventing PLL lock failure
12	TST1	I	Test input (Normally “L”)
13	TST2	I	
14	SCLK	I	Microcomputer IF clock input
15	XLAT	I	Microcomputer IF latch/chip enable input
16	SWDT	I	Microcomputer IF write data input
17	SRDT	O	Microcomputer IF read data output
18	DQSY	O	Microcomputer IF Sub-Q sync and ID sync output
19	CKOUT	O	VCO clock output (freerunning, 384fs, 512fs)
20	FS128	O	128fs clock output (Not used)
21	BCK	O	Bit clock output
22	LRCK	O	L/R clock output
23	DATAOUT	O	Audio data output
24	ERROR	O	PLL lock error mute output

• IC206 Shock-Proof Memory Controller, ATRAC Encoder/Decoder (CXD2537R)/DIG board

Pin No.	Pin Name	I/O	Function
1	VDD	—	Power supply (+5V)
2	SWDT	I	Input of write data signal from system controller
3	SCK	I	Input of serial clock signal from system controller
4	XLAT	I	Input of serial latch signal from system controller
5	SRDT	O/Z	Output of read data signal to system controller
6	SENSE	O/Z	Internal status (SENSE) output (Not used)
7	SCMD0	I	Serial command control mode input (Fixed at "H")
8	SCMD1	I	
9	XINT	O	Interrupt status output
10	RCPB	I	Recording/playback switching input "L": Recording mode (Fixed at "L")
11	WRMN	I	Write/monitor mode switching signal input "H": Monitor mode (Fixed at "L")
12	TX	I	Write data transmission timing input Also used as magnetic field head ON/OFF output
13	VSS	—	Ground
14	SICK	I	Chip reservation pin (Fixed at "L")
15	IDSL	I	
16	XILT	I	Chip reservation pin (Fixed at "H")
17	XRST	I	Input of reset signal from system controller Reset: "L"
18 to 21	TS0 to TS3	I	Test pin (Fixed at "L")
22	EXIR	I	Chip reservation pin (Fixed at "L")
23	SASL	I	Block selection in single use "L": ATRAC "H": RAM controller (Fixed at "L")
24	SNGLE	I	Normally fixed at "L" Fixed at "H" when used as ATRAC or RAM controller for single (Fixed at "L")
25	VSS	—	Ground
26	AIRCPB	O	Output of ATRAC and external audio block recording/playback mode signal (Not used)
27	XRQ	O	ATRAC I/F data request signal output (Not used)
28	ADTO	I	ATRAC decode data signal input (Not used)
29	ADTI	O	ATRAC encode data signal output (Not used)
30	XALT	I	ATRAC I/F XALT signal input (Not used)
31	ACK	I	ATRAC I/F ACK signal input (Not used)
32	AC2	I	ATRAC I/F C2PO signal input (Not used)
33	LCHST	I/O	ATRAC I/F Lch start data signal input/output (Not used)
34	EXE	I/O	ATRAC I/F EXE signal input/output (Not used)
35	MUTE	I/O	ATRAC I/F MUTE signal input/output (Not used)
36	OSCO	O	Clock output (45 MHz) (Not used)
37	OSCI	I	Clock input (45 MHz)
38	VSS	—	Ground
39	ATT	I/O	ATRAC I/F ATT signal input/output (Not used)
40	F86	O	ATRAC block 11.6 msec timing signal output (Not used)
41	DOUT	O	Output of audio data signal to D/A converter
42	ADIN	I	Input of recording signal from A/D converter
43	ABCK	O	Bit clock signal output
44	ALRCK	O	L/R clock output
45 to 47	SA2 to SA0	O	Address signal output (Not used)

* O/Z: In case of no output data, it becomes high impedance

Pin No.	Pin Name	I/O	Function
48, 49	A11, A10	O	Address signal output (Not used)
50	VSS	—	Ground
51	VDD	—	Power supply (+5V)
52 to 55	A03 to A00	O	Address signal output
56 to 60	A04 to A08	O	Address signal output
61	XOE	O	Output enable control signal output
62	XCAS	O	Column address strobe signal output
63	VSS	—	Ground
64	XCS	O	Chip select signal output (Not used)
65	A09	O	Address signal output
66	XRAS	O	Row address strobe signal output
67	XWE	O	Read/write control signal output
68, 69	D1, D0	I/O	Data signal input/output
70 to 74	D2 to D6	I/O	
75	VSS	—	Ground
76	D7	I/O	Data signal input/output (Not used)
77	ERR	I/O	Input/output of error (C2PO) data to external RAM (Not used)
78	EXTC2R	I	External RAM selection input for error data writing (“H”: External RAM) (Fixed at “L”)
79	BUSY	O	RAM access BUSY signal output (Not used)
80	EMP	O	EMPTY or immediately before FULL of ATRAC data (When DSC=ASC+1: “H”) (Not used)
81	FUL	O	FULL or immediately before EMPTY of ATRAC data (When ASC=DSC+1: “H”) (Not used)
82	EQL	O	ATRAC data EMPTY (When DSC=ASC: “H”) (Not used)
83	MDLK	O	Indicates recording/playback data main/sub (“H”: Sub, Linking: “L”: Main) (Not used)
84	CPSY	O	Interpolation sync signal output (Not used)
85	CTMD0	O	DSC counter mode output (Not used)
86	CTMD1	O	
87	SPO	O	System clock (512fs=22.5792 MHz) signal output
88	VSS	—	Ground
89	MDSY	O	Main data sync detection signal output (Not used)
90	LRCK	I	L/R clock signal input (44.1 kHz)
91	BCK	I	Bit clock signal input (2.8224 MHz)
92	C2PO	I	C2PO signal input (Shows data error status) Playback:C2PO (“H”) Digital recording: D In-Vflag Analog recording: “L”
93	DATA	I/O	Recording: Recording audio data signal output Playback: Playback audio data signal input
94	DIDT	I	Input of digital audio input 16-bit data from CXD2535CR
95	DODT	O	Output of digital audio output 16-bit data to CXD2535CR
96	DIRCPB	O	Disc drive and EFM encoder/decoder recording/playback mode output (Not used)
97	MIN	I	External monitor signal input
98	SPOSL	I	Pin 87 (SPO) input/output switching input pin (“L”:IN “H”:OUT) (Not used) (Fixed at “H”)
99	MCK	O	RAM controller internal master clock output (Not used)
100	VSS	—	Ground

• IC207 Sampling Rate Converter, Digital Filter (MSM9404AGS-BX)/DIG board

Pin No.	Pin Name	I/O	Function
1	DO	O	Data output (Not used)
2	SEL	I	Data select control input "L":DI0 → DO, "H":DI1 → DO (Fixed at "L")
3	SRDT	O	Serial data output
4	SWDT	I	Serial data input
5	SCK	I	Serial clock input
6	XLAT	I	Serial latch pulse input
7	INIT	I	Initialize input "L":Reset
8	NC	—	Not used
9	VDD	—	Power supply (+3.3V)
10	NC	—	Not used
11	RBPH	O	Ring buffer R/W phase control monitor signal output "L":Control OFF (Not used)
12	STA	O	Fs conversion rate measurement state monitor signal output "L":High accuracy "H":High speed response mode (Not used)
13	FRS	I	Input/output Fs rate measurement time selection input "L":High accuracy "H":High speed response mode (Fixed at "L")
14	FRM	I	Input/output Fs rate measurement mode signal input "L":Automatic, "H":Manual (Fixed at "L")
15	SLAVE	I	Output sync mode selection input "L":Slave, "H":Master (Fixed at "L")
16	TEST5	I	Test pin (Fixed at "L")
17	TB7	I/O	Test bus input/output (Open)
18	MDO0	I	Data output serial data format setting input (Fixed at "L")
19	MDO1	I	
20	MUTE	I	Output mute setting input "L":Muted (DATAO only)
21	DATAO	O	Data output (Fso output)
22	BCKO	I/O	Data output bit clock input/output
23	LRCKO	I/O	Data output Fso word clock input/output
24	TEST4	I	Test pin (Fixed at "L")
25	GND	—	Ground
26	XI	I	512 Fso output line master clock input
27	GND	—	Ground
28	XO	O	Clock output
29	XOO	O	Output line master clock output (Not used)
30	VDD	—	Power supply (+3.3V)
31	NC	—	Not used
32 to 34	TB6 to TB4	I/O	Test bus input/output (Open)
35	MAO0	I	D/A output serial data format setting input (Fixed at "L")
36	MAO1	I	
37	ALRKO	O	D/A output word clock output Data changes at "L"→"H" edge (Not used)
38	ABCKO	O	D/A output bit clock output Data changes at "L"→"H" edge (Not used)
39	NC	—	Not used
40	VDD	—	Power supply (+3.3V)

Pin No.	Pin Name	I/O	Function
41	NC	—	Not used
42	DAOR	O	Rch D/A 8Fso, 4Fso data output (Not used)
43	DAOL	O	Lch D/A 8Fso, 4Fso data output (Not used)
44	TEST3	I	Test pin (Fixed at “L”)
45	DEMP	I	Deemphasis setting input “L”:OFF (Fixed at “L”)
46	FS1	I	Deemphasis setting input Fsi frequency selection input (Fixed at “L”)
47	FS2	I	
48 to 50	TB3 to TB1	I/O	Test bus input/output (Open)
51	DATAI	I	Data input
52	LRCKI	I	Input data 1Fs word clock input (Schmidt)
53	BCKI	I	Input data bit clock input
54	FIMCK	I	Input data line Fs reference input and master clock input
55	FIMO	O	Master clock output
56	GND	—	Ground
57	TEST2	I	Test pin (Fixed at “L”)
58	TEST1	I	The second reset signal input from system controller
59	FIS	I	FIMCK frequency division rate setting input “L”:1/1 (256 Fs), “H”:1/2 (512 Fs) (Fixed at “H”)
60	MI0	I	Input data format setting input (Fixed at “H”)
61	MI1	I	Input data format setting input (Fixed at “L”)
62	DI0	I	Data input (Not used)
63	DI1	I	
64	TB0	I/O	Test bus input/output (Open)

• IC301 Digital Filter (CXD8512Q)/AD board

Pin No.	Pin Name	I/O	Function
1	TEST	I	Test pin (Fixed at “L”)
2	NC	—	Not used
3	SYNC	I	Sync mode selection (Fixed at “L”)
4	INIT	I	Initialization input
5	NC	—	Not used
6	CFLG	O	Flag output for calibration (Not used)
7, 8	VDD	—	Power supply (+5V)
9	LRKI	I	LRKI input (8fs/2fs/fs) (Not used)
10	BKI	I	BKI input (8fs/2fs/fs) (Not used)
11	NC	—	Not used
12	DLI	I	Lch data input (8fs/2fs/fs) (Not used)
13	DRI	I	Rch data input (8fs/2fs/fs) (Not used)
14	IFLG	O	Input side sync flag output (Not used)
15, 16	NC	—	Not used
17	FE	I	Test pin (Fixed at “L”)
18	AL2	I	Lch data input (64fs) (Not used)
19	AR2	I	Rch data input (64fs) (Not used)
20	AL1	I	Lch data input (64fs)
21	AR1	I	Rch data input (64fs)
22, 23	Vss	—	Ground
24, 25	CVss	—	
26	FCLK	O	FE clock output (128fs)
27	MCLK	I	Master clock input (256fs)
28	CVDD	—	Power supply (+5V)
29	NC	—	Not used
30	IBIT	I	Data input word length selection (64fs) (Fixed at “L”)
31	NC	—	Not used
32	Vss	—	Ground
33	SCALE	I	Test pin (Fixed at “L”)
34	ISEL1	I	Input selection (Fixed at “L”)
35	ISEL2	I	Input selection (Fixed at “L”)
36	NC	—	Not used
37	DITH	I	Dither (Not used)
38	BOOST	I	Boost (Not used)
39	VDD	—	Power supply (+5V)
40	MODE	I	MODE data input (Not used)
41	SHIFT	I	SHIFT clock input (Not used)
42	LATCH	I	LATCH input (Not used)
43	NC	—	Not used
44	LC	I	Low cut (Not used)
45	TEST	I	Test pin (Fixed at “L”)

Pin No.	Pin Name	I/O	Function
46	NC	—	Not used
47	OSEL	I	Test pin (Fixed at “L”)
48	OBIT	I	Output data word length selection “H”: 24 bits, “L”: 16 bits (Fixed at “H”)
49	DRO	O	Rch data output (Not used)
50	DLO	O	Lch data output
51	NC	—	Not used
52, 53	Vss	—	Ground
54	BCK	I/O	SYNC “H”: BCK output, “L”: BCK input
55	NC	—	Not used
56	LRCK	I/O	SYNC “H”: LRCK output, “L”: LRCK input
57	OFLG	O	Output side sync flag output (Not used)
58	VDD	—	Power supply (+5V)
59	OVR	O	Rch overflow flag output (Not used)
60	OVL	O	Lch overflow flag output (Not used)

• IC501 Noise Shaper, Digital Filter (CXD8595Q)/DA board

Pin No.	Pin Name	I/O	Function
1	PLMG2	I	4 bit conversion data setting pin in SCD mode (Fixed at “L”)
2	VDD	—	Power supply (+5V)
3	NSDOL4	O	Noise shaping data Lch parallel output 4 (MSB) (Not used)
4	NSDOL3	O	Noise shaping data Lch parallel output 3 (4SB) (Not used)
5	NSDOL2	O	Noise shaping data Lch parallel output 2 (2SB) (Not used)
6	NSDOL1	O	Noise shaping data Lch parallel output 1 (LSB) (Not used)
7, 8	NC	—	Not used
9, 10	VDD	—	Power supply (+5V)
11	NC	—	Not used
12	64FSI	I	64 Fs clock input
13	NSDOR1	O	Noise shaping data Rch parallel output 1 (LSB) (Not used)
14	NSDOR2	O	Noise shaping data Rch parallel output 2 (2SB) (Not used)
15	NSDOR3	O	Noise shaping data Rch parallel output 3 (4SB) (Not used)
16	NSDOR4	O	Noise shaping data Rch parallel output 4 (MSB) (Not used)
17	MCKIN	I	Master clock input (256 Fs)
18	VDD	—	Power supply (+5V)
19	PLMG1	I	4 bit conversion data setting pin in SCD mode (Fixed at “L”)
20	VSS	—	Ground
21	TEST3	I	Test pin (Fixed at “L”)
22	TEST4	I	
23	DFLRCKO	O	Digital filter data LR clock output
24	DFDTOR	O	Digital filter data Rch data output
25	NC	—	Not used
26	MODE	I	Mode setting pin “L”:CD mode, “H”:DSD mode (Fixed at “L”)
27	DRPOL	I	Rch data polarity setting pin “L”:Positive phase (Fixed at “L”)
28	OVFLAG	O	Digital filter output overflow flag output “H”:Active (Fixed at “L”)
29	MUTEL	O	Mute flag output (Lch) (Not used)
30	MUTER	O	Mute flag output (Rch) (Not used)
31	MTPOL	I	Mute flag polarity setting pin “L”:L active, “H”:H active (Not used)
32	INAF	O	Sync deviation detection flag “H”:Active (Sync deviation detection)
33	DINIT	O	External INIT signal delay signal output (Not used)
34	CKVDD	—	Power supply (+5V) (Clock system)
35	128FSO	O	128 Fs clock output (Not used)
36	NC	—	Not used
37	INVI	I	384 Fs generation three times buffer input (Not used)
38	INVO1	O	First stage buffer output for three times (Not used)
39	INVO2	O	Second stage buffer output for three times (Not used)
40	NC	—	Not used

Pin No.	Pin Name	I/O	Function
41, 42	VSS	—	Ground
43	BCKI	I	Bit clock input
44	DATAI	I	Data input
45	LRCKI	I	LR clock input
46	INIT	I	Initialize input "L":Reset
47	ATT	I	Serial data input
48	SHIFT	I	Serial shift clock input
49	LATCH	I	Serial latch clock input
50	SYSM	I	External mute signal input "H":Active (Fixed at "L")
51	NRGCLR	I	N/S calculation section register clear signal input "H":Active (Fixed at "L")
52	IFSELD	I	Data line input signal voltage level selection pin (Fixed at "L")
53	IFSELC	I	Control line input signal voltage level selection pin (Fixed at "L")
54	NC	—	Not used
55	SBCKI	I	LR clock input (during SCD mode) (Not used)
56	SDATAR	I	Bit clock input (during SCD mode) (Not used)
57	SDATAL	I	Data input (during SCD mode) (Not used)
58	NC	—	Not used
59	DFDTOL	O	Digital filter serial data Lch output
60	DFBCKO	O	Digital filter serial data output bit clock output
61	DFDTEN	I	Digital filter data output "L":OFF, "H":ON
62	TEST1	I	Test pin (Fixed at "L")
63	TEST2	I	
64	VSS	—	Ground

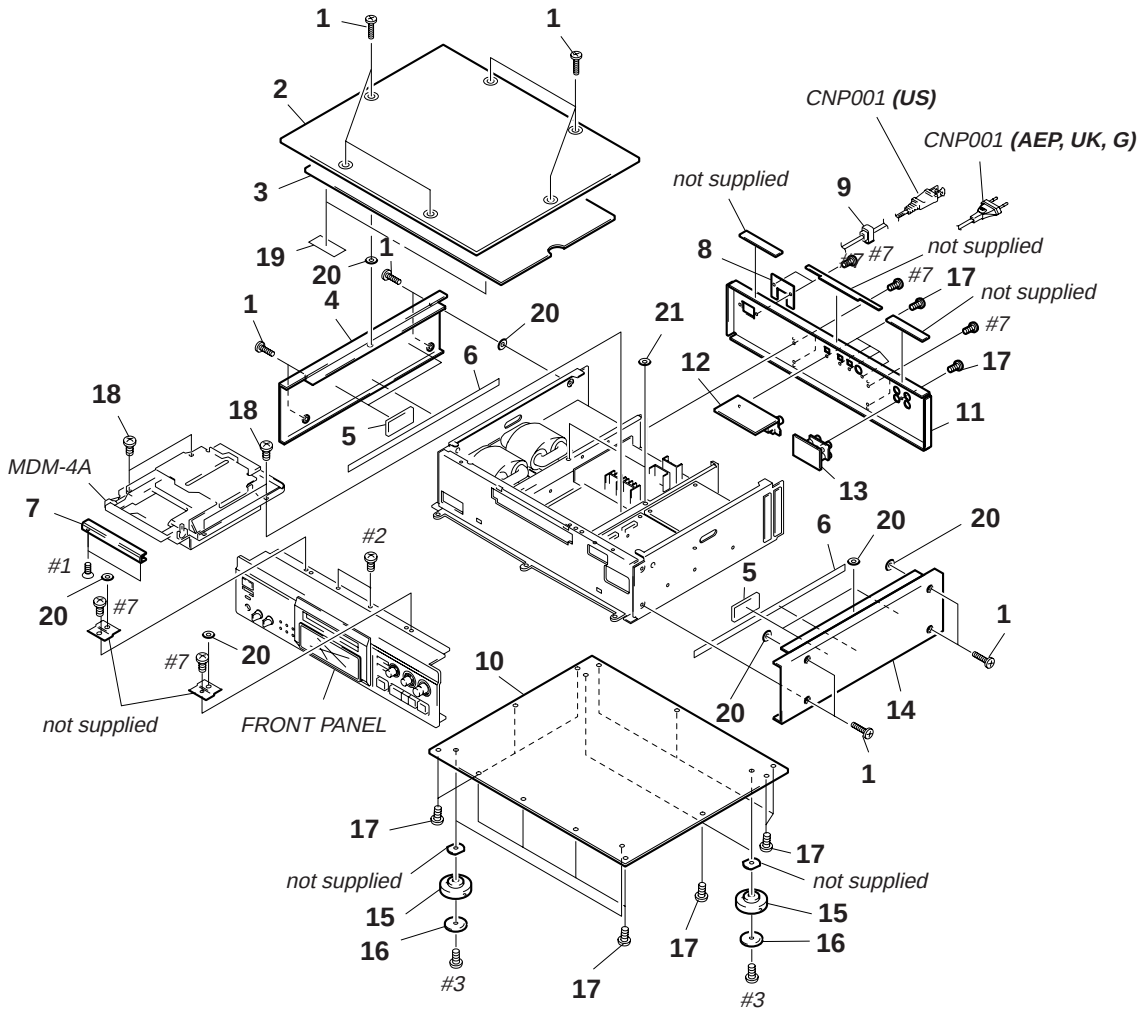
SECTION 7
EXPLODED VIEWS

NOTE:

- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Color Indication of Appearance Parts Example:
  KNOB, BALANCE (RED)
  ↓
  Cabinets color
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list and accessories and packing materials are given in the last of this parts list.
- Abbreviation
  G : German model

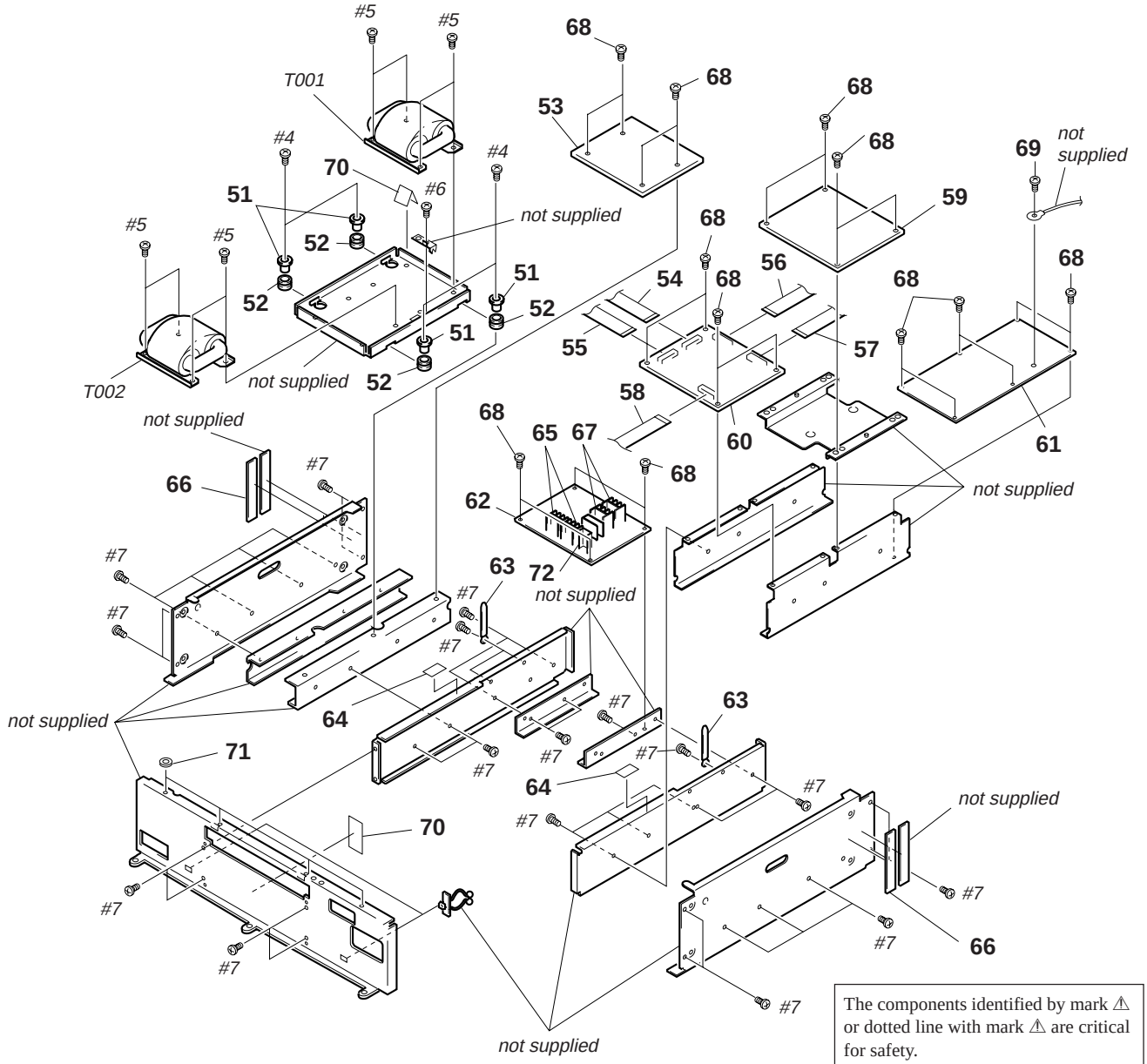
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

7-1. MAIN SECTION



Ref. No.	Part No.	Description	Remark
1	4-976-827-01	SCREW, FLAT HEAD (BLACK)	
1	4-976-827-11	SCREW, FLAT HEAD (GOLD)	
2	4-969-821-01	CASE (TOP PLATE)(BLACK)	
2	4-969-821-11	CASE (TOP PLATE)(GOLD)	
* 3	A-4660-735-A	REINFORCEMENT (TOP PLATE) ASSY	
4	4-969-823-01	PLATE (L), SIDE (BLACK)	
4	4-969-823-11	PLATE (L), SIDE (GOLD)	
5	4-972-438-01	ABSORBENT, VIBRATION	
6	4-972-439-01	SPACER (SCREW HEAD)	
7	4-987-666-01	PANEL, LOADING (GOLD)	
7	4-987-666-11	PANEL, LOADING (BLACK)	
* 8	4-923-873-01	BRACKET, CORD STOPPER	
* 9	3-703-244-00	BUSHING (2104), CORD (AEP,UK,G)	
9	4-916-783-01	BUSHING, CORD (US)	
* 10	4-987-539-01	PLATE, BOTTOM	
* 11	4-987-511-22	PANEL, BACK (AEP,UK,G)	
* 11	4-987-511-31	PANEL, BACK (US)	
* 12	A-4699-457-A	DIO BOARD, COMPLETE	
* 13	1-664-817-11	PJ BOARD	
14	4-969-824-01	PLATE (R), SIDE (BLACK)	
14	4-969-824-11	PLATE (R) SIDE (GOLD)	
15	4-970-487-01	FOOT (F50180S)	
16	4-970-124-11	CUSHION (F50180S)	
17	4-929-074-01	SCREW (3X8)	
18	4-974-510-01	SCREW (+BV 3X8 B)	
19	9-911-830-XX	SHEET, HB	
20	4-949-302-31	WASHER (GREEN t 0.25)	
21	4-945-431-01	WASHER (BLACK t 0.8)	
⚠ CNP001	1-558-568-21	CORD, POWER (AEP,UK,G)	
⚠ CNP001	1-559-583-21	CORD, POWER (US)	

7-2. CHASSIS SECTION

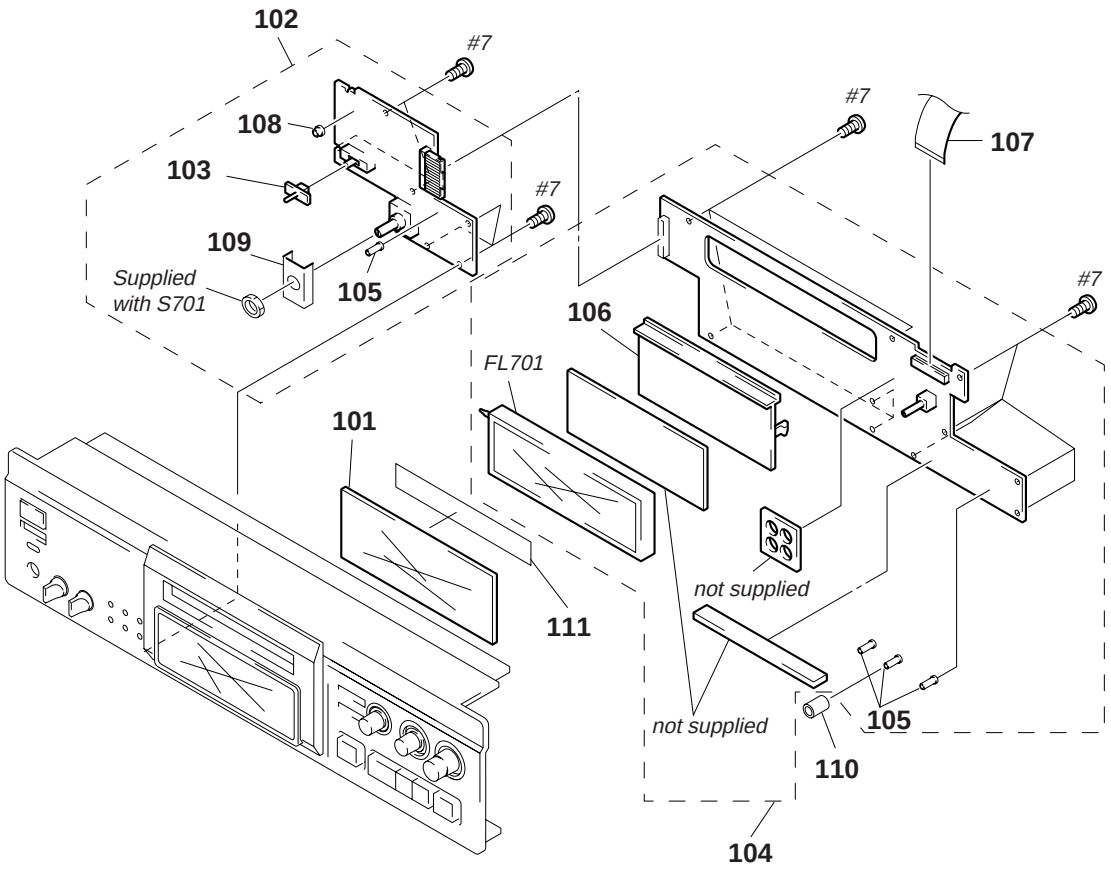


The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
51	4-928-032-01	COLLAR (A)	
* 52	4-888-798-00	BUSHING, RUBBER	
* 53	1-664-815-11	AC BOARD	
54	1-782-216-11	WIRE (FLAT TYPE)(30 CORE)	
55	1-782-215-11	WIRE (FLAT TYPE)(18 CORE)	
56	1-777-738-11	WIRE (FLAT TYPE)(26 CORE)	
57	1-777-737-11	WIRE (FLAT TYPE)(16 CORE)	
58	1-777-735-11	WIRE (FLAT TYPE)(18 CORE)	
* 59	A-4699-453-A	AD BOARD, COMPLETE	
* 60	A-4699-589-A	DIG BOARD, COMPLETE (US)	
* 60	A-4699-593-A	DIG BOARD, COMPLETE (AEP,UK,G)	
* 61	A-4699-454-A	DA BOARD, COMPLETE	
* 62	A-4699-455-A	PW BOARD, COMPLETE (US)	
* 62	A-4699-591-A	PW BOARD, COMPLETE (AEP,UK,G)	
63	3-703-397-01	STOPPER, WIRING	

Ref. No.	Part No.	Description	Remark
64	3-846-312-11	SPACER (E)	
* 65	4-363-146-00	HEAT SINK, V.OUT	
66	4-972-440-01	SPACER	
* 67	4-921-402-01	HEAT SINK	
68	4-974-510-01	SCREW (+BV 3X8 B)	
69	2-259-121-01	SCREW, TR	
70	3-831-441-XX	CUSHION	
71	4-945-431-01	WASHER	
* 72	3-309-144-21	HEAT SINK	
⚠T001	1-431-178-11	TRANSFORMER, POWER (AEP,UK,G)	
⚠T001	1-431-180-11	TRANSFORMER, POWER (US)	
⚠T002	1-431-179-11	TRANSFORMER, POWER (AEP,UK,G)	
⚠T002	1-431-181-11	TRANSFORMER, POWER (US)	

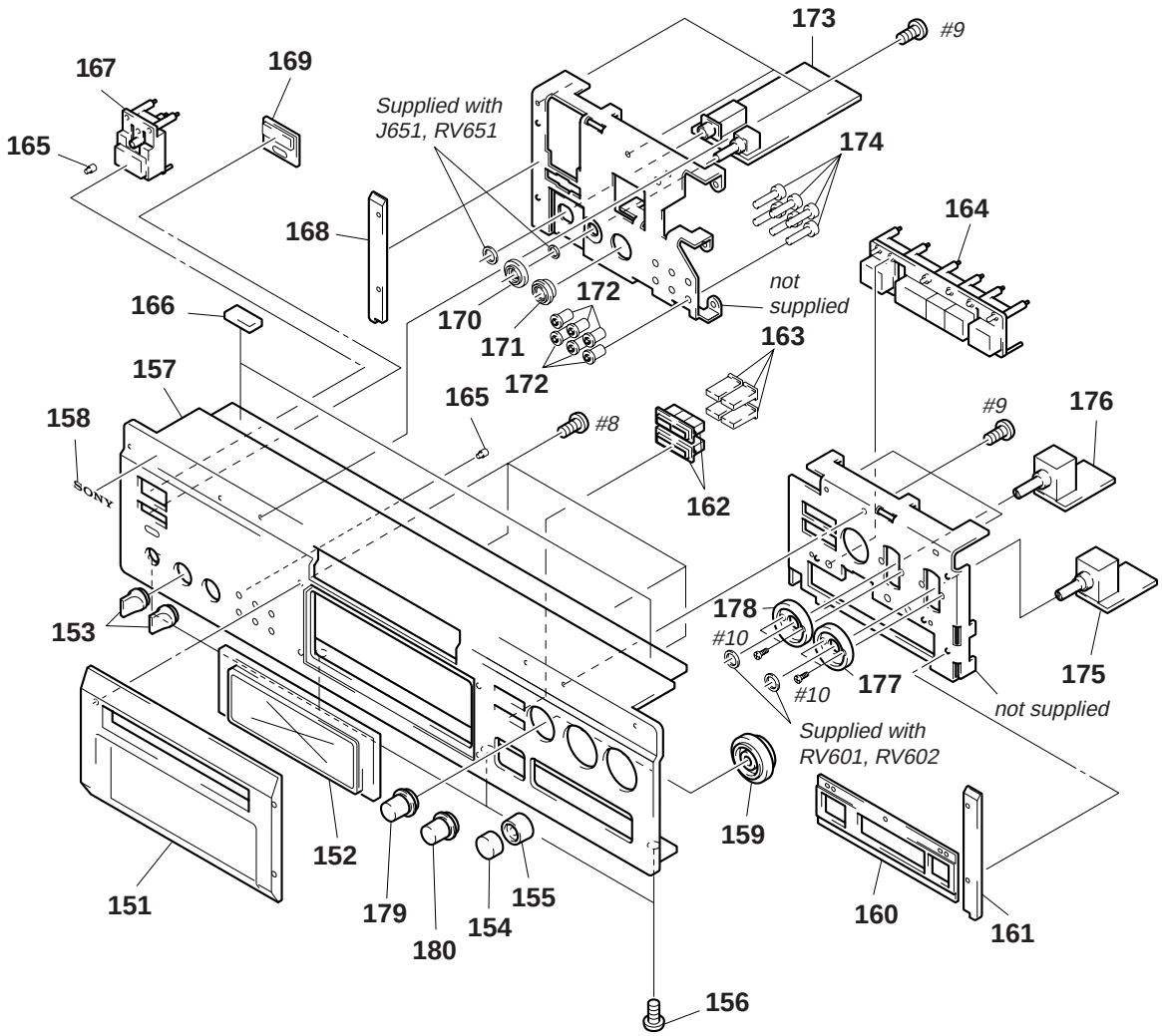
7-3. FRONT PANEL SECTION 1



Ref. No.	Part No.	Description	Remark
101	4-987-518-01	FILTER	
* 102	A-4699-460-A	PSW BOARD, COMPLETE	
103	4-971-774-01	KNOB (TIMER)(BLACK)	
103	4-971-774-21	KNOB (TIMER)(GOLD)	
* 104	A-4699-459-A	DISP BOARD, COMPLETE	
* 105	3-362-478-11	HOLDER (T), LED	
* 106	4-987-501-01	HOLDER (FL)	

Ref. No.	Part No.	Description	Remark
107	1-777-736-11	WIRE (FLAT TYPE)(26 CORE)	
* 108	4-972-608-01	HOLDER (DIA. 5), LED	
109	4-976-360-02	REINFORCEMENT (CONT)	
* 110	4-988-382-01	COVER (LED)	
111	4-989-035-01	CUSHION (FL)	
FL701	1-517-620-11	INDICATOR TUBE, FLUORESCENT	

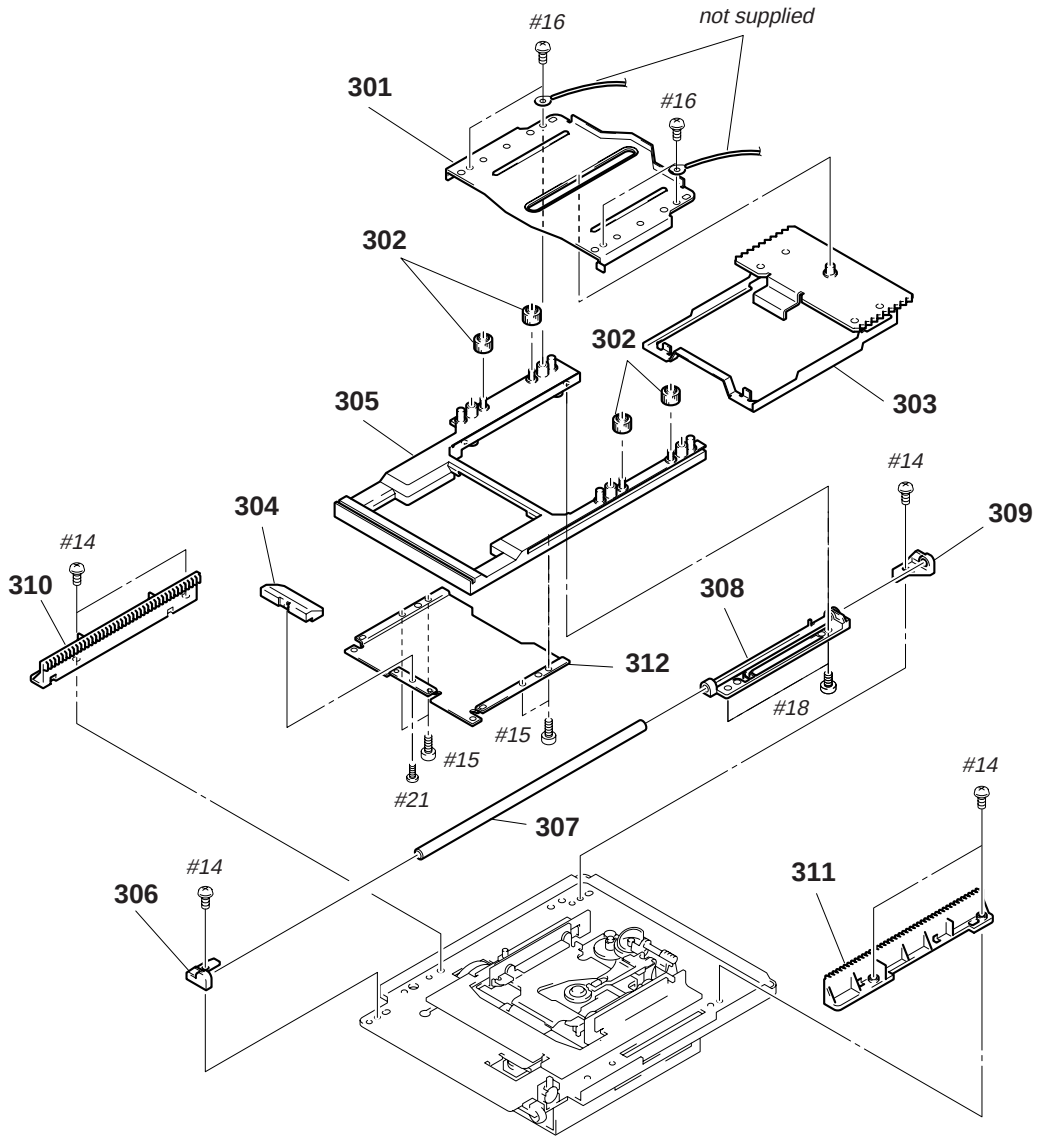
7-4. FRONT PANEL SECTION 2



Ref. No.	Part No.	Description	Remark
151	4-987-495-01	PANEL (GOLD)(ESCUTCHEON)	
151	4-987-495-11	PANEL (BLACK)(ESCUTCHEON)	
152	4-987-517-01	PLATE, INDICATION	
153	4-987-527-01	KNOB (VOL)(GOLD)	
153	4-987-527-11	KNOB (VOL)(BLACK)	
154	4-987-525-01	KNOB (REC R)(GOLD)	
154	4-987-525-11	KNOB (REC R)(BLACK)	
155	4-987-524-01	KNOB (REC L)(GOLD)	
155	4-987-524-11	KNOB (REC L)(BLACK)	
156	4-929-074-01	SCREW (3X8)	
157	4-987-494-01	PANEL, FRONT (GOLD)(AEP,UK,G)	
157	4-987-494-11	PANEL, FRONT (BLACK)(AEP,UK,G)	
157	4-987-494-21	PANEL, FRONT (BLACK)(US)	
158	4-942-568-01	EMBLEM (NO.5), SONY (BLACK)	
158	4-942-568-31	EMBLEM (NO.5), SONY (GOLD)	
* 159	4-987-535-01	GUIDE (AMS)(GOLD)	
* 159	4-987-535-11	GUIDE (AMS)(BLACK)	
160	4-987-500-01	ESCUTCHEON (GOLD)	
160	4-987-500-11	ESCUTCHEON (BLACK)	
161	4-987-503-01	PANEL (EDGE R)(GOLD)	
161	4-987-503-11	PANEL (EDGE R)(BLACK)	
* 162	4-987-512-01	GUIDE (EDIT)(GOLD)	
* 162	4-987-512-11	GUIDE (EDIT)(BLACK)	
163	4-987-523-01	BUTTON (EDIT)(GOLD)	
163	4-987-523-11	BUTTON (EDIT)(BLACK)	
164	X-4947-844-1	BUTTON (PLAY) ASSY (GOLD)	
164	X-4947-845-1	BUTTON (PLAY) ASSY (BLACK)	

Ref. No.	Part No.	Description	Remark
165	4-987-519-01	INDICATOR (D2)	
166	9-911-842-XX	RUBBER (B)	
167	4-987-496-01	BUTTON (POWER)(GOLD)	
167	4-987-496-11	BUTTON (POWER)(BLACK)	
168	4-987-502-01	PANEL (EDGE L)(GOLD)	
168	4-987-502-11	PANEL (EDGE L)(BLACK)	
169	4-987-520-01	WINDOW (REMOTE CONTROL)(GOLD)	
169	4-987-520-11	WINDOW (REMOTE CONTROL)(BLACK)	
* 170	4-987-514-01	GUIDE (VOL)(GOLD)	
* 170	4-987-514-11	GUIDE (VOL)(BLACK)	
* 171	4-987-515-01	GUIDE (INPUT)(GOLD)	
* 171	4-987-515-11	GUIDE (INPUT)(BLACK)	
* 172	4-987-513-01	GUIDE (FUNC)	
* 173	A-4699-461-A	HP BOARD, COMPLETE	
174	4-987-522-01	BUTTON (FUNC)(GOLD)	
174	4-987-522-11	BUTTON (FUNC)(BLACK)	
* 175	1-664-821-11	A VOL BOARD	
* 176	1-664-822-11	D VOL BOARD	
177	4-987-516-01	GUIDE (REC)(GOLD)	
177	4-987-516-11	GUIDE (REC)(BLACK)	
178	4-987-516-21	GUIDE (REC)(GOLD)	
178	4-987-516-31	GUIDE (REC)(BLACK)	
179	4-987-526-01	KNOB (AMS)(GOLD)	
179	4-987-526-11	KNOB (AMS)(BLACK)	
180	4-987-526-21	KNOB (AMS)(WITH RED POINT)(GOLD)	
180	4-987-526-31	KNOB (AMS)(WITH RED POINT)(BLACK)	

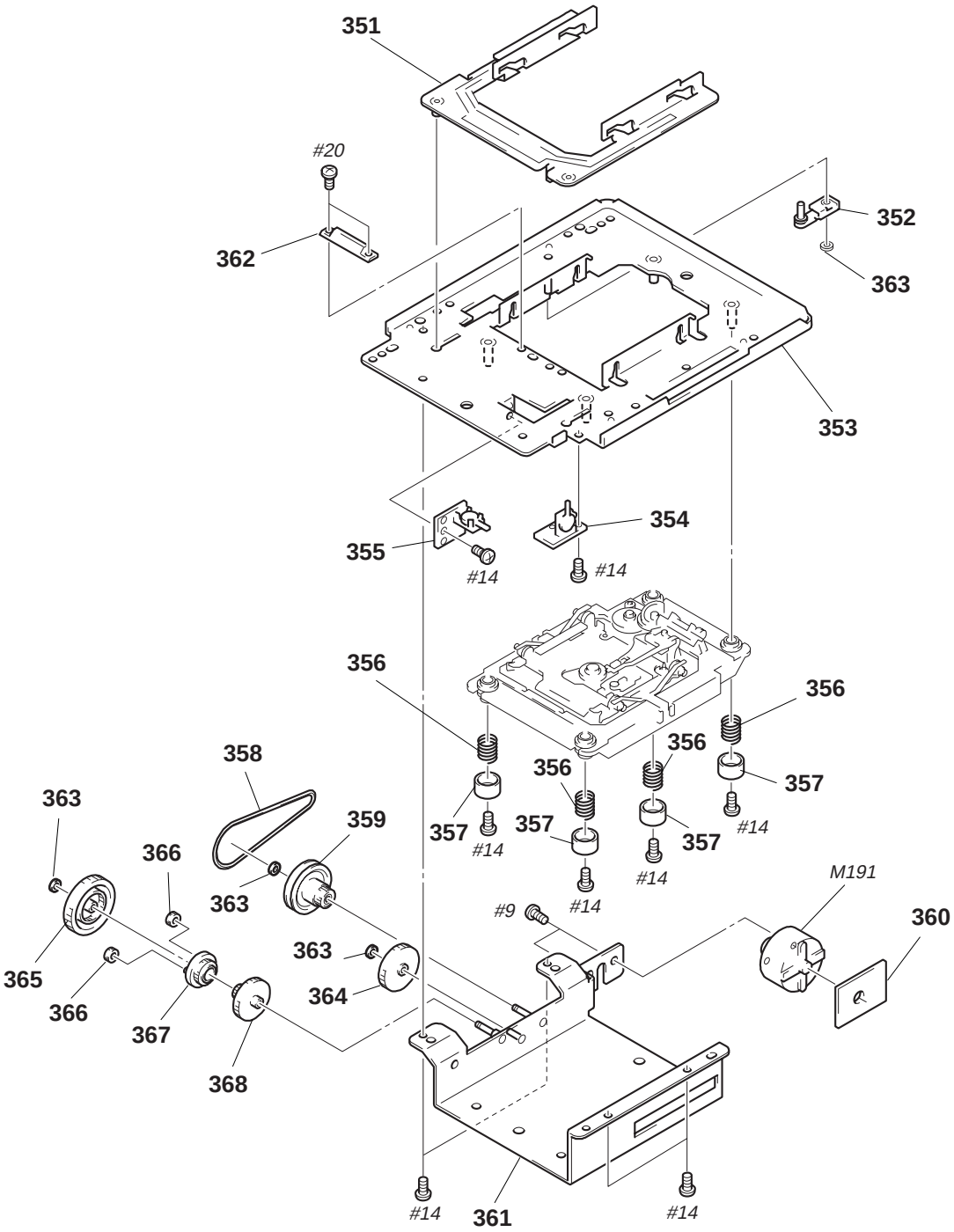
7-5. MECHANISM SECTION 1 (MDM-4A)



Ref. No.	Part No.	Description	Remark
* 301	4-987-291-01	BRACKET (TOP)	
302	4-987-293-01	GEAR (4)	
* 303	X-4947-820-1	SLIDER (D) ASSY	
* 304	4-987-267-01	TABLE (EJECT)	
* 305	4-987-282-01	TRAY	
306	4-987-270-01	STOPPER (SHAFT A)	
* 307	4-987-295-01	SHAFT	

Ref. No.	Part No.	Description	Remark
* 308	4-987-294-01	GUIDE (SHAFT)	
309	4-987-271-01	STOPPER (SHAFT B)	
310	4-987-269-01	RACK (L)	
311	4-987-268-01	RACK (R)	
312	4-987-290-01	BRACKET (TRAY)	

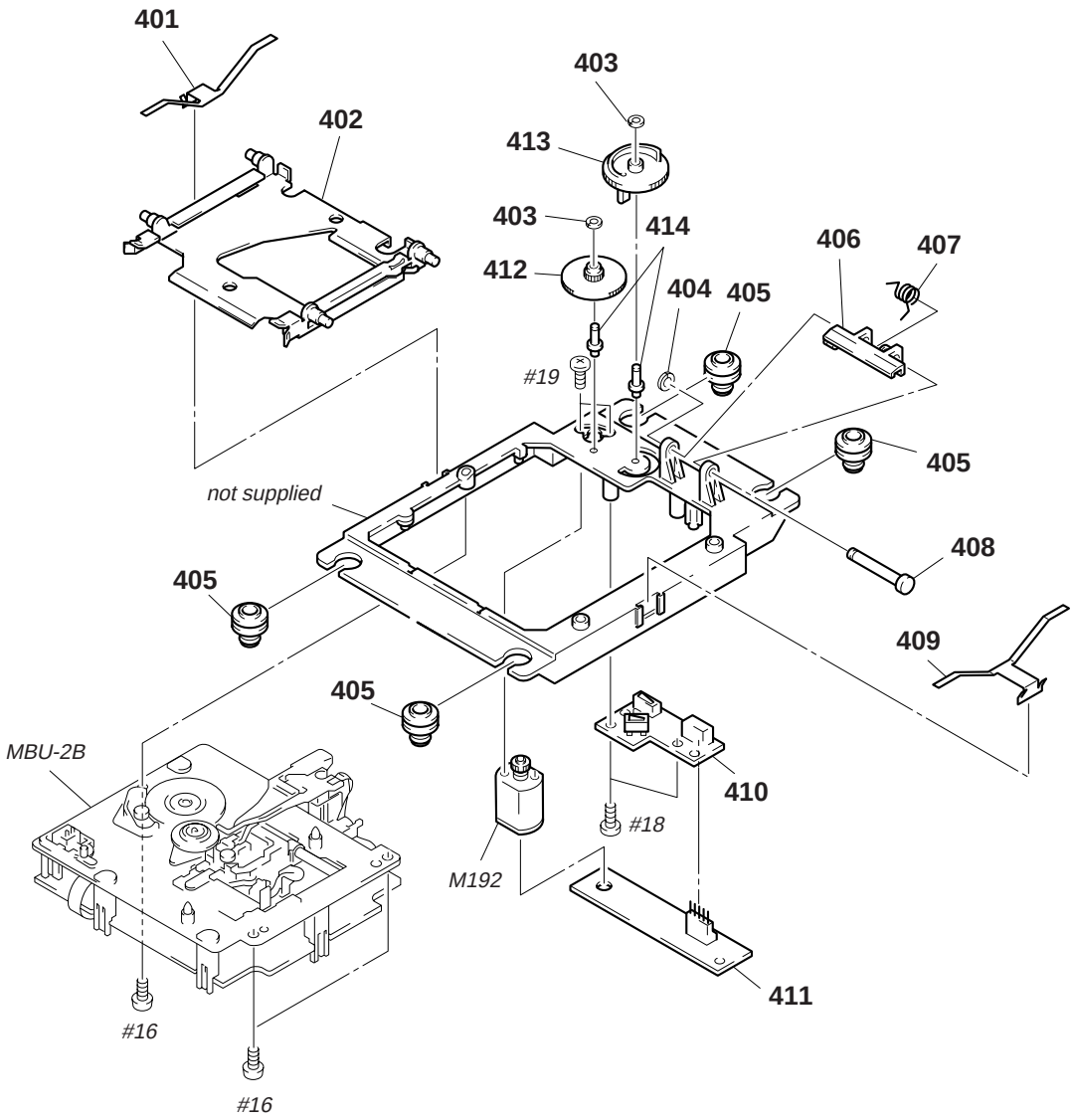
7-6. MECHANISM SECTION 2 (MDM-4A)



Ref. No.	Part No.	Description	Remark
* 351	X-4947-819-1	SLIDER ASSY	
352	X-4947-937-1	LEVER (LOCK) ASSY	
* 353	X-4947-818-1	CHASSIS ASSY	
* 354	1-663-898-11	OUT BOARD	
* 355	1-663-897-11	IN BOARD	
356	4-987-313-01	SPRING, COMPRESSION	
* 357	4-987-314-01	COLLAR (DAMPER)	
358	4-987-308-01	BELT (LOADING)	
359	4-987-297-01	GEAR, PULLEY	
* 360	1-663-900-11	LMOT BOARD	

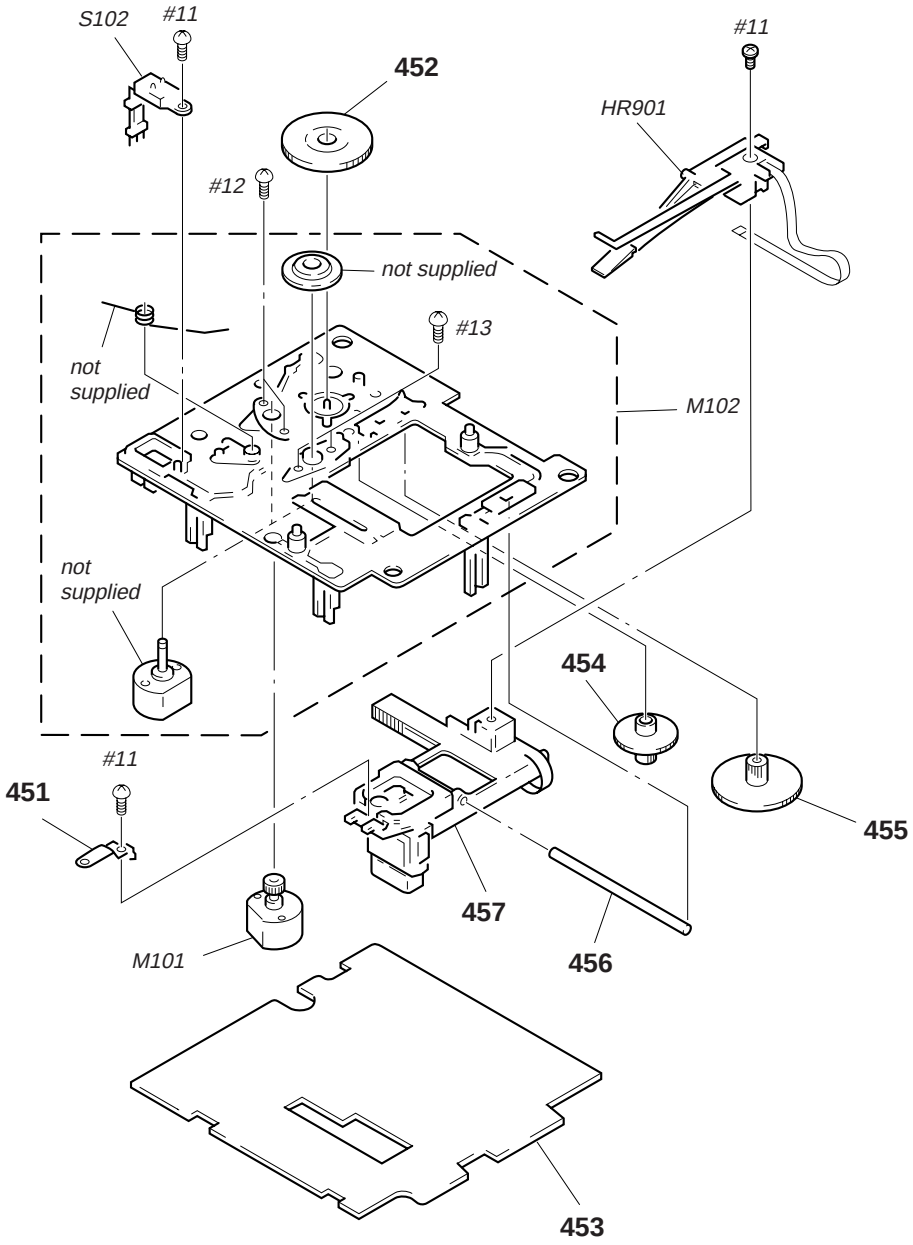
Ref. No.	Part No.	Description	Remark
* 361	X-4947-823-1	BRACKET (MOTOR) ASSY	
362	4-987-274-01	TABLE (LOADING)	
363	4-968-919-31	WASHER, STOPPER	
364	4-987-302-01	GEAR	
365	4-987-298-01	GEAR (A), PLANET	
366	4-987-301-01	GEAR (D), PLANET	
367	4-987-300-01	GEAR (C), PLANET	
368	4-987-299-01	GEAR (B), PLANET	
M191	X-4947-824-1	MOTOR (LOADING) ASSY	

7-7. MECHANISM SECTION 3 (MDM-4A)



Ref. No.	Part No.	Description	Remark
401	4-987-273-01	SPRING (UDL), LEAF	
* 402	X-4947-847-1	HOLDER ASSY	
403	4-989-938-01	WASHER, STOPPER	
404	4-968-919-31	WASHER, STOPPER	
405	4-987-312-01	INSULATOR (MD)	
406	4-987-306-01	LEVER (OWH)	
407	4-987-307-01	SPRING (OWH), TORSION	
* 408	4-989-233-01	SHAFT (OWH)	
409	4-987-272-01	SPRING (UDR), LEAF	
* 410	1-663-896-11	HLIM BOARD	
* 411	1-663-899-11	HMOT BOARD	
412	4-987-276-01	GEAR (HEAD-B)	
413	4-987-277-01	GEAR (HEAD-C)	
* 414	4-987-278-01	SHAFT (HEAD)	
M192	X-4947-821-1	MOTOR ASSY, HEAD	

7-8. BASE UNIT SECTION (MBU-2B)



The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
451	4-967-679-01	SPRING (OP), LEAF	
452	4-967-675-01	GEAR (SL-A)	
* 453	A-4673-809-A	BD BOARD, COMPLETE	
454	4-967-676-01	GEAR (SL-B)	
455	4-967-677-01	GEAR (SL-C)	
456	4-967-678-01	SHAFT (OP)	

Ref. No.	Part No.	Description	Remark
⚠457	8-583-009-12	OPTICAL PICK-UP KMS-210A/J-N	
HR901	1-500-304-21	HEAD, OVER WRITE	
M101	A-4660-651-A	MOTOR ASSY (SLED)	
M102	A-4660-650-A	CHASSIS ASSY, BU (SPINDLE)	
S102	1-762-148-11	SWITCH, PUSH (2 KEY)(PROTECT/REFLECT)	

AC AD

SECTION 8
ELECTRICAL PARTS LIST

Note:

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- RESISTORS
  All resistors are in ohms
  METAL: Metal-film resistor
  METAL OXIDE: Metal Oxide-film resistor
  F : nonflammable
- SEMICONDUCTORS
  In each case, u: µ , for example:
  uA...: µ A..., uPA...: µ PA..., uPB...: µ PB..., uPC...: µ PC..., uPD...: µ PD...
- CAPACITORS
  uF : µ F
- COILS
  uH : µ H
- Abbreviation
  G: German model

Ref. No.	Part No.	Description			Remark
*	1-664-815-11	AC BOARD			
		********			
		< CAPACITOR >			
⚠C001	1-113-920-11	CERAMIC	0.0022uF	20%	250V (AEP,UK,G)
⚠C002	1-113-920-11	CERAMIC	0.0022uF	20%	250V
⚠C003	1-113-920-11	CERAMIC	0.0022uF	20%	250V
⚠C004	1-113-920-11	CERAMIC	0.0022uF	20%	250V
⚠C005	1-113-925-11	CERAMIC	0.01uF	20%	250V
⚠C006	1-113-925-11	CERAMIC	0.01uF	20%	250V
⚠C007	1-113-925-11	CERAMIC	0.01uF	20%	250V (AEP,UK,G)
		< CONNECTOR >			
CN002	1-580-230-11	PIN, CONNECTOR (PC BOARD) 2P			
CN003	1-564-321-00	PIN, CONNECTOR 2P			
* CN004	1-564-321-21	PIN, CONNECTOR 2P			
		< GROUND PLATE >			
* EP001	4-870-539-00	PLATE, GROUND			
		< LINE FILTER >			
⚠LF001	1-424-485-11	FILTER, LINE			
		< SWITCH >			
⚠S001	1-762-764-11	SWITCH, POWER (MAIN POWER)(AEP,UK,G)			
**********					
*	A-4699-453-A	AD BOARD, COMPLETE			
		******************			
		< CAPACITOR >			
C301	1-164-159-11	CERAMIC	0.1uF		50V
C302	1-164-159-11	CERAMIC	0.1uF		50V
C303	1-164-159-11	CERAMIC	0.1uF		50V
C304	1-126-923-11	ELECT	220uF	20%	10V
C305	1-164-159-11	CERAMIC	0.1uF		50V
C306	1-162-294-31	CERAMIC	0.001uF	10%	50V
C307	1-164-159-11	CERAMIC	0.1uF		50V
C308	1-164-159-11	CERAMIC	0.1uF		50V
C309	1-164-159-11	CERAMIC	0.1uF		50V
C310	1-164-159-11	CERAMIC	0.1uF		50V
C311	1-164-159-11	CERAMIC	0.1uF		50V
C312	1-164-159-11	CERAMIC	0.1uF		50V
C313	1-164-732-11	CERAMIC	0.1uF	20%	50V
C314	1-164-732-11	CERAMIC	0.1uF	20%	50V
C315	1-164-732-11	CERAMIC	0.1uF	20%	50V
C316	1-136-820-11	FILM	0.01uF	5%	100V
C317	1-136-820-11	FILM	0.01uF	5%	100V
C318	1-164-732-11	CERAMIC	0.1uF	20%	50V
C319	1-126-052-11	ELECT	100uF	20%	16V
C320	1-164-732-11	CERAMIC	0.1uF	20%	50V
C321	1-126-103-11	ELECT	470uF	20%	16V
C322	1-126-103-11	ELECT	470uF	20%	16V
C323	1-164-732-11	CERAMIC	0.1uF	20%	50V
C324	1-164-732-11	CERAMIC	0.1uF	20%	50V
C325	1-164-732-11	CERAMIC	0.1uF	20%	50V
C326	1-164-732-11	CERAMIC	0.1uF	20%	50V
C327	1-128-201-11	ELECT	100uF	20%	50V
C328	1-128-201-11	ELECT	100uF	20%	50V
C329	1-126-023-11	ELECT	100uF	20%	25V
C330	1-126-023-11	ELECT	100uF	20%	25V
C331	1-126-023-11	ELECT	100uF	20%	25V
C332	1-126-023-11	ELECT	100uF	20%	25V
C333	1-126-023-11	ELECT	100uF	20%	25V
C334	1-126-023-11	ELECT	100uF	20%	25V
C335	1-126-023-11	ELECT	100uF	20%	25V
C336	1-126-023-11	ELECT	100uF	20%	25V
		< CONNECTOR >			
CN301	1-580-463-11	SOCKET, CONNECTOR 16P			
* CN302	1-564-509-11	PLUG, CONNECTOR 6P			
CN303	1-564-511-11	PLUG, CONNECTOR 8P			
* CN304	1-564-508-11	PLUG, CONNECTOR 5P			
		< DIODE >			
D301	8-719-987-63	DIODE 1N4148M			
D302	8-719-987-63	DIODE 1N4148M			
D303	8-719-987-63	DIODE 1N4148M			
D304	8-719-987-63	DIODE 1N4148M			
D305	8-719-987-63	DIODE 1N4148M			
D306	8-719-987-63	DIODE 1N4148M			
D307	8-719-987-63	DIODE 1N4148M			
D308	8-719-987-63	DIODE 1N4148M			
		< GROUND PLATE >			
* EP301	4-870-539-00	PLATE, GROUND			
* EP302	4-870-539-00	PLATE, GROUND			
		< IC >			
IC301	8-759-280-17	IC CXD8512Q			
IC302	8-759-330-53	IC CXD8493M-E1			
IC303	8-759-701-65	IC NJM79M05FA			
IC304	8-759-604-35	IC M5F78M05L			
IC305	8-759-712-02	IC NJM2114D			

Ref. No.	Part No.	Description				Remark
IC306	8-759-712-02	IC NJM2114D				
IC307	8-759-712-02	IC NJM2114D				
IC308	8-759-712-02	IC NJM2114D				
		< COIL >				
L301	1-408-405-00	INDUCTOR	4.7uH			
L302	1-408-405-00	INDUCTOR	4.7uH			
		< RESISTOR >				
R301	1-259-404-11	CARBON	100	5%	1/6W	
R302	1-259-380-11	CARBON	10	5%	1/6W	
R303	1-259-380-11	CARBON	10	5%	1/6W	
R304	1-259-380-11	CARBON	10	5%	1/6W	
R308	1-259-404-11	CARBON	100	5%	1/6W	
R309	1-259-380-11	CARBON	10	5%	1/6W	
R310	1-259-404-11	CARBON	100	5%	1/6W	
R311	1-249-504-11	CARBON	10	5%	1/4W	
R312	1-249-504-11	CARBON	10	5%	1/4W	
R313	1-249-504-11	CARBON	10	5%	1/4W	
R314	1-249-504-11	CARBON	10	5%	1/4W	
R315	1-249-576-11	CARBON	10K	5%	1/4W	
R316	1-249-576-11	CARBON	10K	5%	1/4W	
R317	1-249-576-11	CARBON	10K	5%	1/4W	
R318	1-249-576-11	CARBON	10K	5%	1/4W	
R319	1-249-576-11	CARBON	10K	5%	1/4W	
R320	1-249-576-11	CARBON	10K	5%	1/4W	
R321	1-249-588-91	CARBON	33K	5%	1/4W	
R322	1-249-588-91	CARBON	33K	5%	1/4W	
R323	1-247-722-11	CARBON	5.6K	5%	1/4W	F
R324	1-247-722-11	CARBON	5.6K	5%	1/4W	F
R325	1-249-469-11	CARBON	100K	5%	1/4W	
R326	1-249-469-11	CARBON	100K	5%	1/4W	
R327	1-249-552-11	CARBON	1K	5%	1/4W	
R328	1-249-552-11	CARBON	1K	5%	1/4W	
R329	1-249-995-11	CARBON	1M	5%	1/4W	
R330	1-249-995-11	CARBON	1M	5%	1/4W	
R331	1-249-995-11	CARBON	1M	5%	1/4W	
R332	1-249-995-11	CARBON	1M	5%	1/4W	

****

*	1-664-821-11	AVOL BOARD	
		**********	
		< CONNECTOR >	
CN604	1-564-511-11	PLUG, CONNECTOR 8P	
		< RESISTOR >	
R601	1-249-461-11	CARBON	18K
R602	1-249-459-11	CARBON	12K
R603	1-249-459-11	CARBON	12K
R604	1-249-461-11	CARBON	18K
		< VARIABLE RESISTOR >	
RV601	1-225-371-11	RES, VAR, CARBON 50K/50K	(ANALOG REC LEVEL)

****

Ref. No.	Part No.	Description			Remark
*	A-4673-809-A	BD BOARD, COMPLETE			
		**********			
		< CAPACITOR >			
C101	1-104-913-11	TANTAL. CHIP	10uF	20%	16V
C102	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C103	1-104-913-11	TANTAL. CHIP	10uF	20%	16V
C104	1-104-913-11	TANTAL. CHIP	10uF	20%	16V
C105	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C106	1-163-275-11	CERAMIC CHIP	0.001uF	5%	50V
C107	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C108	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C109	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C111	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C112	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C113	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C114	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C115	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C116	1-163-019-00	CERAMIC CHIP	0.0068uF	10%	50V
C117	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C119	1-104-913-11	TANTAL. CHIP	10uF	20%	16V
C121	1-126-395-11	ELECT	22uF	20%	16V
C122	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C123	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C124	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C125	1-104-760-11	CERAMIC CHIP	0.047uF	10%	50V
C126	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C127	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C128	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C129	1-107-823-11	CERAMIC CHIP	0.47uF	10%	16V
C130	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C131	1-104-760-11	CERAMIC CHIP	0.047uF	10%	50V
C132	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C133	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C134	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C135	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C136	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C141	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C142	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C143	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C144	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C151	1-104-913-11	TANTAL. CHIP	10uF	20%	16V
C152	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C155	1-104-916-11	TANTAL. CHIP	6.8uF	20%	20V
C160	1-104-601-11	ELECT CHIP	10uF	20%	10V
C161	1-104-601-11	ELECT CHIP	10uF	20%	10V
C163	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C164	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C166	1-163-275-11	CERAMIC CHIP	0.001uF	5%	50V
C167	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C169	1-104-913-11	TANTAL. CHIP	10uF	20%	16V
C170	1-104-913-11	TANTAL. CHIP	10uF	20%	16V
C171	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C175	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C176	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C177	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C178	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C181	1-104-913-11	TANTAL. CHIP	10uF	20%	16V

BD

Ref. No.	Part No.	Description			Remark
C182	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C183	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C184	1-107-836-11	ELECT CHIP	22uF	20%	8V
C185	1-164-611-11	CERAMIC CHIP	0.001uF	10%	500V
C186	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C191	1-126-395-11	ELECT	22uF	20%	16V
C192	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C193	1-164-346-11	CERAMIC CHIP	1uF		16V
C194	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
		< CONNECTOR >			
CN101	1-766-508-11	CONNECTOR, FFC/FPC (ZIF) 22P			
CN102	1-766-510-21	CONNECTOR, FFC/FPC 30P			
CN103	1-766-509-21	CONNECTOR, FFC/FPC 18P			
CN104	1-766-898-21	HOUSING, CONNECTOR (PC BOARD) 4P			
		< DIODE >			
D101	8-719-988-62	DIODE 1SS355			
D155	8-719-031-17	DIODE 1SS322-TE85L			
D161	8-719-421-15	DIODE MA8027-L			
D181	8-719-033-60	DIODE F1P2STP			
D183	8-719-033-60	DIODE F1P2STP			
		< IC >			
IC101	8-752-072-68	IC CXA1981AR			
IC102	8-759-243-19	IC TC7SU04F			
IC121	8-752-378-79	IC CXD2535CR			
IC122	8-759-243-19	IC TC7SU04F			
IC151	8-759-179-60	IC MPC17A38VMEL			
IC171	8-759-504-12	IC X24C01S			
IC172	8-759-149-73	IC uPC842G2			
IC181	8-759-095-65	IC TC74ACT540FS			
IC182	8-759-243-19	IC TC7SU04F			
IC191	8-759-822-99	IC L88MS05T-FA			
		< COIL >			
L101	1-414-234-11	INDUCTOR, FERRITE BEAD			
L102	1-414-234-11	INDUCTOR, FERRITE BEAD			
L103	1-414-234-11	INDUCTOR, FERRITE BEAD			
L105	1-414-234-11	INDUCTOR, FERRITE BEAD			
L106	1-414-234-11	INDUCTOR, FERRITE BEAD			
L121	1-414-234-11	INDUCTOR, FERRITE BEAD			
L122	1-412-039-51	INDUCTOR CHIP	100uH		
L151	1-412-622-51	INDUCTOR	10uH		
L152	1-412-622-51	INDUCTOR	10uH		
L153	1-412-039-51	INDUCTOR CHIP	100uH		
L154	1-412-039-51	INDUCTOR CHIP	100uH		
L155	1-410-980-51	INDUCTOR CHIP	1mH		
L161	1-414-234-11	INDUCTOR, FERRITE BEAD			
L162	1-414-234-11	INDUCTOR, FERRITE BEAD			
L195	1-233-316-21	FILTER, CHIP EMI			
		< MOTOR >			
M101	A-4660-651-A	MOTOR (SLED) ASSY			
M102	A-4660-650-A	CHASSIS ASSY, BU (SPINDLE)			
		< TRANSISTOR >			
Q101	8-729-905-12	TRANSISTOR DTA144EU			
Q151	8-729-905-18	TRANSISTOR DTC144EU			
Q162	8-729-101-07	TRANSISTOR 2SB798-DL			
Q163	8-729-905-12	TRANSISTOR DTA144EU			
Q164	8-729-924-19	TRANSISTOR DTA123JU			
Q181	8-729-018-75	TRANSISTOR 2SJ278MY			
Q182	8-729-017-65	TRANSISTOR 2SK1764KY			
		< RESISTOR >			
R101	1-216-077-00	METAL CHIP	15K	5%	1/10W
R102	1-216-073-00	METAL CHIP	10K	5%	1/10W
R103	1-216-073-00	METAL CHIP	10K	5%	1/10W
R104	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R105	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R106	1-216-133-00	METAL CHIP	3.3M	5%	1/10W
R107	1-216-113-00	METAL CHIP	470K	5%	1/10W
R110	1-216-077-00	METAL CHIP	15K	5%	1/10W
R113	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R114	1-216-025-91	METAL GLAZE	100	5%	1/10W
R116	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R117	1-216-113-00	METAL CHIP	470K	5%	1/10W
R120	1-216-025-91	METAL GLAZE	100	5%	1/10W
R121	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R122	1-216-295-91	CONDUCTOR, CHIP (2012)			
R123	1-216-037-00	METAL CHIP	330	5%	1/10W
R124	1-216-025-91	METAL GLAZE	100	5%	1/10W
R125	1-216-025-91	METAL GLAZE	100	5%	1/10W
R128	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R129	1-216-037-00	METAL CHIP	330	5%	1/10W
R130	1-216-041-00	METAL CHIP	470	5%	1/10W
R131	1-216-073-00	METAL CHIP	10K	5%	1/10W
R132	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R133	1-216-129-00	METAL CHIP	2.2M	5%	1/10W
R134	1-216-037-00	METAL CHIP	330	5%	1/10W
R135	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R136	1-216-041-00	METAL CHIP	470	5%	1/10W
R137	1-216-025-91	METAL GLAZE	100	5%	1/10W
R139	1-216-017-91	METAL GLAZE	47	5%	1/10W
R140	1-216-017-91	METAL GLAZE	47	5%	1/10W
R141	1-216-295-91	CONDUCTOR, CHIP		(2012)	
R142	1-216-073-00	METAL CHIP	10K	5%	1/10W
R143	1-216-073-00	METAL CHIP	10K	5%	1/10W
R144	1-216-025-91	METAL GLAZE	100	5%	1/10W
R145	1-216-121-91	METAL GLAZE	1M	5%	1/10W
R146	1-216-037-00	METAL CHIP	330	5%	1/10W
R147	1-216-025-91	METAL GLAZE	100	5%	1/10W
R148	1-216-045-00	METAL CHIP	680	5%	1/10W
R150	1-216-295-91	CONDUCTOR, CHIP		(2012)	
R151	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R154	1-220-262-11	METAL GLAZE	680	5%	1/4W
R155	1-220-262-11	METAL GLAZE	680	5%	1/4W
R158	1-216-121-91	METAL GLAZE	1M	5%	1/10W
R161	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R162	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R163	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R164	1-216-045-00	METAL CHIP	680	5%	1/10W
R165	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R166	1-220-250-11	METAL GLAZE	10	5%	1/2W
R167	1-216-065-00	METAL CHIP	4.7K	5%	1/10W

Ref. No.	Part No.	Description			Remark
R169	1-219-724-11	METAL CHIP	1	1%	1/4W
R170	1-216-073-00	METAL CHIP	10K	5%	1/10W
R171	1-216-073-00	METAL CHIP	10K	5%	1/10W
R172	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R174	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R176	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R178	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R181	1-216-073-00	METAL CHIP	10K	5%	1/10W
R182	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R183	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R186	1-216-134-00	METAL CHIP	2.2	5%	1/8W
R187	1-216-134-00	METAL CHIP	2.2	5%	1/8W
		< VARIABLE RESISTOR >			
RV101	1-241-396-11	RES, ADJ, METAL GLAZE 22K			
RV102	1-241-396-11	RES, ADJ, METAL GLAZE 22K			
		< SWITCH >			
S101	1-572-467-61	SWITCH, PUSH (1 KEY)(LIMIT IN)			
**********					
*	A-4699-454-A	DA BOARD, COMPLETE			
		**********			
		< BUS BAR >			
* BB501	1-560-242-71	BUS BAR 6P			
		< CAPACITOR >			
C501	1-126-923-11	ELECT	220uF	20%	10V
C502	1-162-294-31	CERAMIC	0.001uF	10%	50V
C503	1-164-159-11	CERAMIC	0.1uF		50V
C504	1-126-923-11	ELECT	220uF	20%	10V
C505	1-164-159-11	CERAMIC	0.1uF		50V
C506	1-126-923-11	ELECT	220uF	20%	10V
C507	1-164-159-11	CERAMIC	0.1uF		50V
C508	1-164-159-11	CERAMIC	0.1uF		50V
C509	1-164-159-11	CERAMIC	0.1uF		50V
C510	1-126-923-11	ELECT	220uF	20%	10V
C511	1-162-294-31	CERAMIC	0.001uF	10%	50V
C512	1-126-923-11	ELECT	220uF	20%	10V
C513	1-126-335-11	ELECT	220uF	20%	10V
C514	1-164-159-11	CERAMIC	0.1uF		50V
C515	1-164-159-11	CERAMIC	0.1uF		50V
C516	1-126-335-11	ELECT	220uF	20%	10V
C517	1-164-159-11	CERAMIC	0.1uF		50V
C518	1-164-159-11	CERAMIC	0.1uF		50V
C519	1-162-199-31	CERAMIC	10PF	5%	50V
C520	1-162-199-31	CERAMIC	10PF	5%	50V
C521	1-126-335-11	ELECT	220uF	20%	10V
C522	1-126-335-11	ELECT	220uF	20%	10V
C523	1-164-159-11	CERAMIC	0.1uF		50V
C524	1-126-335-11	ELECT	220uF	20%	10V
C525	1-124-689-11	ELECT	1000uF	20%	16V
C526	1-130-973-00	FILM	0.022uF	5%	63V
C527	1-124-721-11	ELECT	10uF	20%	50V
C528	1-130-973-00	FILM	0.022uF	5%	63V
C529	1-124-721-11	ELECT	10uF	20%	50V

Ref. No.	Part No.	Description			Remark
C530	1-164-159-11	CERAMIC	0.1uF		50V
C531	1-124-721-11	ELECT	10uF	20%	50V
C532	1-164-159-11	CERAMIC	0.1uF		50V
C533	1-126-052-11	ELECT	100uF	20%	16V
C534	1-126-052-11	ELECT	100uF	20%	16V
C535	1-164-732-11	CERAMIC	0.1uF	20%	50V
C536	1-124-721-11	ELECT	10uF	20%	50V
C537	1-126-052-11	ELECT	100uF	20%	16V
C539	1-126-052-11	ELECT	100uF	20%	16V
C540	1-126-052-11	ELECT	100uF	20%	16V
C541	1-126-052-11	ELECT	100uF	20%	16V
C543	1-164-732-11	CERAMIC	0.1uF	20%	50V
C544	1-136-165-00	FILM	0.1uF	5%	50V
C545	1-136-165-00	FILM	0.1uF	5%	50V
C547	1-124-724-11	ELECT	47uF	20%	50V
C548	1-124-724-11	ELECT	47uF	20%	50V
C549	1-136-165-00	FILM	0.1uF	5%	50V
C550	1-136-165-00	FILM	0.1uF	5%	50V
C551	1-126-052-11	ELECT	100uF	20%	16V
C553	1-126-052-11	ELECT	100uF	20%	16V
C554	1-164-732-11	CERAMIC	0.1uF	20%	50V
C555	1-164-732-11	CERAMIC	0.1uF	20%	50V
C556	1-130-973-00	FILM	0.022uF	5%	63V
C557	1-130-973-00	FILM	0.022uF	5%	63V
C558	1-126-103-11	ELECT	470uF	20%	16V
C559	1-126-103-11	ELECT	470uF	20%	16V
C560	1-164-732-11	CERAMIC	0.1uF	20%	50V
C561	1-164-732-11	CERAMIC	0.1uF	20%	50V
C562	1-130-969-11	FILM	0.012uF	3%	100V
C563	1-130-969-11	FILM	0.012uF	3%	100V
C564	1-130-969-11	FILM	0.012uF	3%	100V
C565	1-130-969-11	FILM	0.012uF	3%	100V
C566	1-136-233-11	FILM	0.0047uF	3%	100V
C567	1-136-233-11	FILM	0.0047uF	3%	100V
C568	1-136-233-11	FILM	0.0047uF	3%	100V
C569	1-136-233-11	FILM	0.0047uF	3%	100V
C570	1-136-810-11	FILM	220PF	5%	100V
C571	1-136-810-11	FILM	220PF	5%	100V
C572	1-136-810-11	FILM	220PF	5%	100V
C573	1-136-810-11	FILM	220PF	5%	100V
C576	1-136-817-91	FILM	0.0033uF	5%	100V
C577	1-136-817-91	FILM	0.0033uF	5%	100V
C580	1-136-814-11	FILM	0.001uF	5%	100V
C581	1-136-814-11	FILM	0.001uF	5%	100V
C582	1-136-960-11	FILM	0.1uF	10%	160V
C583	1-136-960-11	FILM	0.1uF	10%	160V
C584	1-104-646-11	CERAMIC	2.2uF	20%	50V
C585	1-104-646-11	CERAMIC	2.2uF	20%	50V
C586	1-136-259-11	FILM	0.1uF	3%	100V
C587	1-136-259-11	FILM	0.1uF	3%	100V
C588	1-128-088-11	ELECT	220uF	20%	50V
C589	1-128-088-11	ELECT	220uF	20%	50V
C590	1-162-294-31	CERAMIC	0.001uF	10%	50V
C591	1-164-159-11	CERAMIC	0.1uF		50V
C592	1-164-159-11	CERAMIC	0.1uF		50V
C593	1-162-294-31	CERAMIC	0.001uF	10%	50V
C594	1-164-732-11	CERAMIC	0.1uF	20%	50V

DA

Ref. No.	Part No.	Description			Remark
C595	1-164-159-11	CERAMIC	0.1uF		50V
		< CONNECTOR >			
CN501	1-573-150-11	SOCKET, CONNECTOR 18P			
* CN503	1-564-514-11	PLUG, CONNECTOR 11P			
* CN504	1-564-709-11	PIN, CONNECTOR (SMALL TYPE) 7P			
		< DIODE >			
D501	8-719-987-63	DIODE 1N4148M			
D502	8-719-987-63	DIODE 1N4148M			
D503	8-719-987-63	DIODE 1N4148M			
		< GROUND PLATE >			
* EP501	4-870-539-00	PLATE, GROUND			
* EP502	4-870-539-00	PLATE, GROUND			
		< MOUNT TERMINAL >			
ET501	4-924-264-01	TERMINAL, MOUNT			
		< IC >			
IC501	8-759-442-42	IC CXD8595Q			
IC502	8-759-454-42	IC CXD2562Q-CS			
IC503	8-759-604-35	IC M5F78M05L			
IC504	8-759-371-51	IC CXA8042AS			
IC505	8-759-371-51	IC CXA8042AS			
IC506	8-759-604-95	IC M5F79M07L			
IC507	8-759-605-00	IC M5F78M07L			
IC508	8-759-259-12	IC OPA2604AP			
IC509	8-759-259-12	IC OPA2604AP			
IC510	8-759-443-33	IC OPA2132PA			
IC511	8-759-443-33	IC OPA2132PA			
IC512	8-759-053-07	IC OP-27GP			
IC513	8-759-053-07	IC OP-27GP			
IC514	8-759-242-70	IC TC7WU04F			
IC515	8-759-180-84	IC TC7W74F			
		< COIL >			
L501	1-408-405-00	INDUCTOR	4.7uH		
L502	1-408-405-00	INDUCTOR	4.7uH		
L503	1-408-405-00	INDUCTOR	4.7uH		
L504	1-408-405-00	INDUCTOR	4.7uH		
L505	1-408-405-00	INDUCTOR	4.7uH		
L506	1-408-405-00	INDUCTOR	4.7uH		
L507	1-408-405-00	INDUCTOR	4.7uH		
L508	1-408-405-00	INDUCTOR	4.7uH		
L509	1-408-405-00	INDUCTOR	4.7uH		
		< TRANSISTOR >			
Q501	8-729-224-61	TRANSISTOR 2SK246-Y			
Q502	8-729-224-61	TRANSISTOR 2SK246-Y			
Q505	8-729-140-98	TRANSISTOR 2SD773-34			
		< RESISTOR >			
R501	1-259-380-11	CARBON	10	5%	1/6W
R502	1-259-380-11	CARBON	10	5%	1/6W
R503	1-259-404-11	CARBON	100	5%	1/6W
R504	1-259-380-11	CARBON	10	5%	1/6W

Ref. No.	Part No.	Description			Remark
R505	1-259-380-11	CARBON	10	5%	1/6W
R506	1-259-380-11	CARBON	10	5%	1/6W
R507	1-259-380-11	CARBON	10	5%	1/6W
R508	1-259-404-11	CARBON	100	5%	1/6W
R509	1-259-404-11	CARBON	100	5%	1/6W
R512	1-259-380-11	CARBON	10	5%	1/6W
R513	1-259-404-11	CARBON	100	5%	1/6W
R514	1-259-404-11	CARBON	100	5%	1/6W
R515	1-259-404-11	CARBON	100	5%	1/6W
R516	1-259-404-11	CARBON	100	5%	1/6W
R517	1-259-404-11	CARBON	100	5%	1/6W
R518	1-259-404-11	CARBON	100	5%	1/6W
R519	1-259-412-11	CARBON	220	5%	1/6W
R520	1-259-452-11	CARBON	10K	5%	1/6W
R521	1-247-706-11	CARBON	330	5%	1/4W F
R522	1-247-706-11	CARBON	330	5%	1/4W F
R523	1-247-706-11	CARBON	330	5%	1/4W F
R524	1-247-706-11	CARBON	330	5%	1/4W F
R525	1-247-706-11	CARBON	330	5%	1/4W F
R526	1-247-706-11	CARBON	330	5%	1/4W F
R527	1-247-706-11	CARBON	330	5%	1/4W F
R528	1-247-706-11	CARBON	330	5%	1/4W F
R529	1-247-706-11	CARBON	330	5%	1/4W F
R530	1-247-706-11	CARBON	330	5%	1/4W F
R531	1-249-504-11	CARBON	10	5%	1/4W
R532	1-249-504-11	CARBON	10	5%	1/4W
R533	1-249-504-11	CARBON	10	5%	1/4W
R534	1-249-504-11	CARBON	10	5%	1/4W
R535	1-249-504-11	CARBON	10	5%	1/4W
R536	1-249-504-11	CARBON	10	5%	1/4W
R537	1-249-504-11	CARBON	10	5%	1/4W
R538	1-249-504-11	CARBON	10	5%	1/4W
R539	1-249-514-11	CARBON	27	5%	1/4W
R540	1-249-514-11	CARBON	27	5%	1/4W
R541	1-249-514-11	CARBON	27	5%	1/4W
R542	1-249-514-11	CARBON	27	5%	1/4W
R543	1-249-542-11	CARBON	390	5%	1/4W
R544	1-249-542-11	CARBON	390	5%	1/4W
R545	1-249-542-11	CARBON	390	5%	1/4W
R546	1-249-542-11	CARBON	390	5%	1/4W
R547	1-249-947-11	CARBON	10K	1%	1/4W
R548	1-249-947-11	CARBON	10K	1%	1/4W
R549	1-249-947-11	CARBON	10K	1%	1/4W
R550	1-249-947-11	CARBON	10K	1%	1/4W
R551	1-249-947-11	CARBON	10K	1%	1/4W
R552	1-249-947-11	CARBON	10K	1%	1/4W
R553	1-249-947-11	CARBON	10K	1%	1/4W
R554	1-249-947-11	CARBON	10K	1%	1/4W
R555	1-249-927-11	CARBON	1.5K	1%	1/4W
R556	1-249-927-11	CARBON	1.5K	1%	1/4W
R559	1-249-927-11	CARBON	1.5K	1%	1/4W
R560	1-249-927-11	CARBON	1.5K	1%	1/4W
R565	1-249-977-11	CARBON	180K	1%	1/4W
R566	1-249-977-11	CARBON	180K	1%	1/4W
R569	1-249-934-11	CARBON	3K	1%	1/4W
R570	1-249-934-11	CARBON	3K	1%	1/4W
R571	1-249-616-11	CARBON	470K	5%	1/4W

Ref. No.	Part No.	Description			Remark
R572	1-249-616-11	CARBON	470K	5%	1/4W
R573	1-259-500-11	CARBON	1M	5%	1/6W
R574	1-259-500-11	CARBON	1M	5%	1/6W
R575	1-249-616-11	CARBON	470K	5%	1/4W
R576	1-249-616-11	CARBON	470K	5%	1/4W
R577	1-249-528-91	CARBON	100	5%	1/4W
R578	1-249-528-91	CARBON	100	5%	1/4W
R581	1-259-452-11	CARBON	10K	5%	1/6W
R582	1-259-452-11	CARBON	10K	5%	1/6W
R583	1-259-452-11	CARBON	10K	5%	1/6W
R584	1-249-469-11	CARBON	100K	5%	1/4W
R585	1-249-469-11	CARBON	100K	5%	1/4W
R586	1-259-428-11	CARBON	1K	5%	1/6W
R587	1-259-428-11	CARBON	1K	5%	1/6W
		< RELAY >			
RY501	1-515-802-11	RELAY			
		< VIBRATOR >			
X501	1-579-161-11	VIBRATOR, CRYSTAL (45MHz)			
**********					
*	A-4699-589-A	DIG BOARD, COMPLETE (US)			
		**********			
*	A-4699-593-A	DIG BOARD, COMPLETE (AEP,UK,G)			
		**********			
		< CAPACITOR >			
C201	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C202	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C203	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C204	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V
C205	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C206	1-126-204-11	ELECT CHIP	47uF	20%	16V
C207	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C208	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V
C209	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C210	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V
C211	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V
C212	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V
C213	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V
C214	1-126-204-11	ELECT CHIP	47uF	20%	16V
C215	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C216	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C217	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C218	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C219	1-126-204-11	ELECT CHIP	47uF	20%	16V
C220	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V
C221	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C222	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C223	1-163-231-11	CERAMIC CHIP	15PF	5%	50V
C224	1-163-231-11	CERAMIC CHIP	15PF	5%	50V
C225	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C226	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V
C227	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V
C228	1-163-109-00	CERAMIC CHIP	47PF	5%	50V
C230	1-163-038-91	CERAMIC CHIP	0.1uF		25V

Ref. No.	Part No.	Description			Remark
C231	1-126-193-11	ELECT	1uF	20%	50V
C232	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C233	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C234	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C236	1-126-204-11	ELECT CHIP	47uF	20%	16V
C238	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C239	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C240	1-126-204-11	ELECT CHIP	47uF	20%	16V
C241	1-126-204-11	ELECT CHIP	47uF	20%	16V
C242	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C243	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C244	1-126-204-11	ELECT CHIP	47uF	20%	16V
C245	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C246	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C247	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C248	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C249	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V
C250	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C251	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C252	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C255	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C256	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C258	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C259	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C261	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C262	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C263	1-163-109-00	CERAMIC CHIP	47PF	5%	50V
C264	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V
C265	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C266	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C267	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C268	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C269	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C270	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V
C271	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C272	1-163-109-00	CERAMIC CHIP	47PF	5%	50V
C273	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C275	1-163-038-91	CERAMIC CHIP	0.1uF		25V
		< CONNECTOR >			
CN201	1-766-510-21	CONNECTOR, FFC/FPC 30P			
CN202	1-766-502-31	PIN, CONNECTOR (FOR PCB)			
CN203	1-770-142-11	CONNECTOR, FFC (ZIF) 26P			
CN204	1-766-502-31	PIN, CONNECTOR (FOR PCB)			
CN205	1-770-142-11	CONNECTOR, FFC (ZIF) 26P			
CN206	1-766-509-21	CONNECTOR, FFC/FPC 18P			
CN207	1-580-888-11	SOCKET, CONNECTOR (SMT) 18P			
CN208	1-580-887-11	SOCKET, CONNECTOR (SMT) 16P			
* CN209	1-750-492-31	PIN, CONNECTOR (PC BOARD) 4P			
		< IC >			
IC201	8-759-040-83	IC BA6287F			
IC202	8-759-464-10	IC M30610EC-1086FP			
IC203	8-759-444-20	IC LC89051V-TLM			
IC204	8-759-426-95	IC L88MS33T-TL			
IC205	8-759-456-31	IC TC74LCX244FS(EL)			
IC206	8-752-381-28	IC CXD2537R			

DIG

Ref. No.	Part No.	Description			Remark
IC207	8-759-461-47	IC MSM9404AGS-BK			
IC208	8-759-344-86	IC MSM514400C-70SJ			
IC210	8-759-272-05	IC TC74VHCT244F(EL)			
IC211	8-759-031-84	IC SC7S04F			
IC212	8-759-040-83	IC BA6287F			
		< JUMPER RESISTOR >			
JW201	1-216-295-91	CONDUCTOR, CHIP (2012)			
		< COIL >			
L201	1-412-336-41	INDUCTOR	4.7uH		
L202	1-412-336-41	INDUCTOR	4.7uH		
L203	1-412-336-41	INDUCTOR	4.7uH		
L204	1-412-336-41	INDUCTOR	4.7uH		
L205	1-412-336-41	INDUCTOR	4.7uH		
L206	1-412-336-41	INDUCTOR	4.7uH		
		< TRANSISTOR >			
Q201	8-729-907-00	TRANSISTOR DTC114EU			
Q202	8-729-907-00	TRANSISTOR DTC114EU			
		< RESISTOR >			
R201	1-216-021-00	METAL CHIP	68	5%	1/10W
R203	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R204	1-216-073-00	METAL CHIP	10K	5%	1/10W
R205	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R206	1-216-073-00	METAL CHIP	10K	5%	1/10W
R207	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R209	1-216-073-00	METAL CHIP	10K	5%	1/10W
R210	1-216-073-00	METAL CHIP	10K	5%	1/10W
R211	1-216-073-00	METAL CHIP	10K	5%	1/10W
R212	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R213	1-216-073-00	METAL CHIP	10K	5%	1/10W
R214	1-216-073-00	METAL CHIP	10K	5%	1/10W
R216	1-216-073-00	METAL CHIP	10K	5%	1/10W (AEP,UK,G)
R217	1-216-073-00	METAL CHIP	10K	5%	1/10W (US)
R218	1-216-073-00	METAL CHIP	10K	5%	1/10W (US)
R219	1-216-073-00	METAL CHIP	10K	5%	1/10W (AEP,UK,G)
R220	1-216-073-00	METAL CHIP	10K	5%	1/10W
R221	1-216-073-00	METAL CHIP	10K	5%	1/10W
R222	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R223	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R224	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R225	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R226	1-216-073-00	METAL CHIP	10K	5%	1/10W
R227	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R228	1-216-073-00	METAL CHIP	10K	5%	1/10W
R229	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R230	1-216-109-00	METAL CHIP	330K	5%	1/10W
R231	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R232	1-216-073-00	METAL CHIP	10K	5%	1/10W
R233	1-216-073-00	METAL CHIP	10K	5%	1/10W
R234	1-216-097-91	METAL GLAZE	100K	5%	1/10W

Ref. No.	Part No.	Description			Remark
R235	1-216-073-00	METAL CHIP	10K	5%	1/10W
R236	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R237	1-216-109-00	METAL CHIP	330K	5%	1/10W
R238	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R239	1-216-082-00	METAL GLAZE	24K	5%	1/10W
R240	1-216-073-00	METAL CHIP	10K	5%	1/10W
R241	1-216-073-00	METAL CHIP	10K	5%	1/10W
R242	1-216-029-00	METAL CHIP	150	5%	1/10W
R243	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R244	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R245	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R246	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R247	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R248	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R249	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R250	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R251	1-216-073-00	METAL CHIP	10K	5%	1/10W
R252	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R253	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R254	1-216-073-00	METAL CHIP	10K	5%	1/10W
R255	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R256	1-216-025-91	METAL GLAZE	100	5%	1/10W
R257	1-216-025-91	METAL GLAZE	100	5%	1/10W
R258	1-216-025-91	METAL GLAZE	100	5%	1/10W
R259	1-216-025-91	METAL GLAZE	100	5%	1/10W
R260	1-216-025-91	METAL GLAZE	100	5%	1/10W
R261	1-216-025-91	METAL GLAZE	100	5%	1/10W
R262	1-216-025-91	METAL GLAZE	100	5%	1/10W
R263	1-216-033-00	METAL CHIP	220	5%	1/10W
R264	1-216-033-00	METAL CHIP	220	5%	1/10W
R265	1-216-025-91	METAL GLAZE	100	5%	1/10W
R266	1-216-025-91	METAL GLAZE	100	5%	1/10W
R267	1-216-025-91	METAL GLAZE	100	5%	1/10W
R268	1-216-025-91	METAL GLAZE	100	5%	1/10W
R269	1-216-025-91	METAL GLAZE	100	5%	1/10W
R270	1-216-025-91	METAL GLAZE	100	5%	1/10W
R271	1-216-025-91	METAL GLAZE	100	5%	1/10W
R272	1-216-025-91	METAL GLAZE	100	5%	1/10W
R273	1-216-025-91	METAL GLAZE	100	5%	1/10W
R275	1-216-025-91	METAL GLAZE	100	5%	1/10W
R276	1-216-025-91	METAL GLAZE	100	5%	1/10W
R277	1-216-025-91	METAL GLAZE	100	5%	1/10W
R278	1-216-025-91	METAL GLAZE	100	5%	1/10W
R279	1-216-025-91	METAL GLAZE	100	5%	1/10W
R280	1-216-025-91	METAL GLAZE	100	5%	1/10W
R281	1-216-025-91	METAL GLAZE	100	5%	1/10W
R282	1-216-025-91	METAL GLAZE	100	5%	1/10W
R283	1-216-025-91	METAL GLAZE	100	5%	1/10W
R284	1-216-025-91	METAL GLAZE	100	5%	1/10W
R285	1-216-073-00	METAL CHIP	10K	5%	1/10W
R286	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R287	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R288	1-216-073-00	METAL CHIP	10K	5%	1/10W
R289	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R290	1-216-025-91	METAL GLAZE	100	5%	1/10W
R291	1-216-073-00	METAL CHIP	10K	5%	1/10W

Ref. No.	Part No.	Description			Remark
		< VIBRATOR >			
X201	1-767-273-11	VIBRATOR, CERAMIC (CHIP TYPE)(10MHz)			
X202	1-760-458-21	VIBRATOR, CRYSTAL (32.768kHz)			
**********					
*	A-4699-457-A	DIO BOARD, COMPLETE			
		**********			
		< CAPACITOR >			
C351	1-126-933-11	ELECT	100uF	20%	10V
C352	1-162-294-31	CERAMIC	0.001uF	10%	50V
C353	1-164-159-11	CERAMIC	0.1uF		50V
C354	1-126-933-11	ELECT	100uF	20%	10V
C355	1-164-159-11	CERAMIC	0.1uF		50V
C356	1-162-294-31	CERAMIC	0.001uF	10%	50V
C357	1-162-294-31	CERAMIC	0.001uF	10%	50V
C358	1-164-159-11	CERAMIC	0.1uF		50V
C359	1-126-933-11	ELECT	100uF	20%	10V
C360	1-136-165-00	FILM	0.1uF	5%	50V
C361	1-126-933-11	ELECT	100uF	20%	10V
C362	1-126-933-11	ELECT	100uF	20%	10V
C363	1-126-933-11	ELECT	100uF	20%	10V
C364	1-136-165-00	FILM	0.1uF	5%	50V
C365	1-136-165-00	FILM	0.1uF	5%	50V
C366	1-164-159-11	CERAMIC	0.1uF		50V
C367	1-164-159-11	CERAMIC	0.1uF		50V
C368	1-164-159-11	CERAMIC	0.1uF		50V
C369	1-104-646-11	CERAMIC	2.2uF	20%	50V
		< IC >			
IC351	8-759-926-18	IC SN74HC157ANS			
IC352	8-759-926-17	IC SN74HC153ANS			
IC353	8-759-269-92	IC SN74HCU04ANS-E20			
IC354	8-749-921-12	IC GP1F32T (DIGITAL OUT OPTICAL)			
IC355	8-759-430-27	IC GP1F37R (DIGITAL IN OPT1)			
IC356	8-759-430-27	IC GP1F37R (DIGITAL IN OPT2)			
		< JACK >			
J351	1-568-750-21	JACK, PIN (1P SHIELD TYPE) (DIGITAL IN COAXIAL)			
		< COIL >			
L351	1-408-405-00	INDUCTOR	4.7uH		
L352	1-408-405-00	INDUCTOR	4.7uH		
L353	1-408-405-00	INDUCTOR	4.7uH		
		< RESISTOR >			
R351	1-259-404-11	CARBON	100	5%	1/6W
R352	1-259-404-11	CARBON	100	5%	1/6W
R353	1-259-404-11	CARBON	100	5%	1/6W
R354	1-259-404-11	CARBON	100	5%	1/6W
R355	1-259-404-11	CARBON	100	5%	1/6W
R356	1-259-404-11	CARBON	100	5%	1/6W
R357	1-259-452-11	CARBON	10K	5%	1/6W
R358	1-259-476-11	CARBON	100K	5%	1/6W
R359	1-259-404-11	CARBON	100	5%	1/6W
R360	1-259-452-11	CARBON	10K	5%	1/6W
R361	1-259-404-11	CARBON	100	5%	1/6W
R363	1-259-404-11	CARBON	100	5%	1/6W
R364	1-259-404-11	CARBON	100	5%	1/6W
R365	1-259-401-11	CARBON	75	5%	1/6W
R366	1-259-404-11	CARBON	100	5%	1/6W
**********					
*	A-4699-459-A	DISP BOARD, COMPLETE			
		**********			
*	3-362-478-11	HOLDER (T), LED			
*	4-987-501-01	HOLDER (FL)			
		< CAPACITOR >			
C701	1-164-159-11	CERAMIC	0.1uF		50V
C702	1-162-282-31	CERAMIC	100PF	10%	50V
C703	1-164-159-11	CERAMIC	0.1uF		50V
C704	1-126-154-11	ELECT	47uF	20%	6.3V
C705	1-162-282-31	CERAMIC	100PF	10%	50V
C706	1-162-282-31	CERAMIC	100PF	10%	50V
C707	1-162-282-31	CERAMIC	100PF	10%	50V
C708	1-162-294-31	CERAMIC	0.001uF	10%	50V
C709	1-162-302-11	CERAMIC	0.0022uF	30%	16V
C710	1-162-302-11	CERAMIC	0.0022uF	30%	16V
C712	1-164-159-11	CERAMIC	0.1uF		50V
C713	1-164-159-11	CERAMIC	0.1uF		50V
C714	1-164-159-11	CERAMIC	0.1uF		50V
C715	1-162-286-31	CERAMIC	220PF	10%	50V
C716	1-162-286-31	CERAMIC	220PF	10%	50V
		< CONNECTOR >			
CN701	1-766-201-11	SOCKET, CONNECTOR PIN 11P			
CN702	1-580-473-11	SOCKET, CONNECTOR 26P			
		< DIODE >			
D701	8-719-301-39	DIODE SEL2210S (●)			
D702	8-719-301-49	DIODE SEL2810A (▮▮)			
D703	8-719-303-02	DIODE SEL2510C-D (►)			
		< FLUORESCENT INDICATOR >			
FL701	1-517-620-11	INDICATOR TUBE, FLUORESCENT			
		< IC >			
IC701	8-759-297-23	IC M66004M8FP			
		< TRANSISTOR >			
Q701	8-729-661-94	TRANSISTOR RT1N141SK-TP			
Q702	8-729-661-94	TRANSISTOR RT1N141SK-TP			
Q703	8-729-661-94	TRANSISTOR RT1N141SK-TP			
		< RESISTOR >			
R701	1-259-464-11	CARBON	33K	5%	1/6W
R702	1-259-404-11	CARBON	100	5%	1/6W
R703	1-259-404-11	CARBON	100	5%	1/6W
R704	1-259-404-11	CARBON	100	5%	1/6W
R705	1-259-404-11	CARBON	100	5%	1/6W
R709	1-259-452-11	CARBON	10K	5%	1/6W
R710	1-259-452-11	CARBON	10K	5%	1/6W

DISP **DVOL** **HLIM** **HMOT** **HP**

Ref. No.	Part No.	Description			Remark
R723	1-259-464-11	CARBON	33K	5%	1/6W
R724	1-259-452-11	CARBON	10K	5%	1/6W
R725	1-259-444-11	CARBON	4.7K	5%	1/6W
R726	1-259-440-11	CARBON	3.3K	5%	1/6W
R727	1-259-436-11	CARBON	2.2K	5%	1/6W
R728	1-259-452-11	CARBON	10K	5%	1/6W
R729	1-259-464-11	CARBON	33K	5%	1/6W
R730	1-259-452-11	CARBON	10K	5%	1/6W
R731	1-259-444-11	CARBON	4.7K	5%	1/6W
R732	1-259-440-11	CARBON	3.3K	5%	1/6W
R733	1-259-436-11	CARBON	2.2K	5%	1/6W
R734	1-259-412-11	CARBON	220	5%	1/6W
R735	1-259-412-11	CARBON	220	5%	1/6W
R736	1-259-452-11	CARBON	10K	5%	1/6W
R737	1-259-418-11	CARBON	390	5%	1/6W
		< SWITCH >			
S702	1-473-965-11	ENCODER, ROTARY (⏮ AMS ⏭, PUSH ENTER)			
S717	1-554-303-21	SWITCH, TACTILE (⏏ OPEN/CLOSE)			
S718	1-554-303-21	SWITCH, TACTILE (YES)			
S719	1-554-303-21	SWITCH, TACTILE (EDIT/NO)			
S720	1-554-303-21	SWITCH, TACTILE (●)			
S721	1-554-303-21	SWITCH, TACTILE (⏸)			
S722	1-554-303-21	SWITCH, TACTILE (►)			
S723	1-554-303-21	SWITCH, TACTILE (►►)			
S724	1-554-303-21	SWITCH, TACTILE (◄◄)			
S725	1-554-303-21	SWITCH, TACTILE (■)			

****

*	1-664-822-11	DVOL BOARD				
		**********				
		< CAPACITOR >				
C601	1-162-294-31	CERAMIC	0.001uF	10%	50V	
C602	1-104-664-11	ELECT	47uF	20%	25V	
C603	1-164-159-11	CERAMIC	0.1uF		50V	
		< CONNECTOR >				
* CN603	1-564-720-11	PIN, CONNECTOR (SMALL TYPE) 4P				
		< VARIABLE RESISTOR >				
RV602	1-225-373-11	RES, VAR, CARBON 10K (DIGITAL REC LEVEL)				

****

*	1-663-896-11	HLIM BOARD				
		**********				
		< CONNECTOR >				
* CN195	1-750-148-11	SOCKET, CONNECTOR (PC BOARD) 5P				
		< SWITCH >				
SW193	1-762-010-11	SWITCH, LEVER (HEAD DOWN DET)				
SW194	1-762-010-11	SWITCH, LEVER (HEAD UP DET)				

****

Ref. No.	Part No.	Description			Remark
*	1-663-899-11	HMOT BOARD			
		**********			
		< MOTOR >			
M192	X-4947-821-1	MOTOR ASSY, HEAD			
		< CONNECTOR >			
* CN196	1-568-947-11	PIN, CONNECTOR 9P			
CN197	1-568-940-21	PIN, CONNECTOR 2P			
* CN198	1-568-941-11	PIN, CONNECTOR 3P			
CN199	1-778-987-11	PIN,BOARD TO BOARD CONNECTOR5P			

****

*	A-4699-461-A	HP BOARD, COMPLETE			
		**********			
		< CAPACITOR >			
C651	1-162-207-31	CERAMIC	22PF	5%	50V
C652	1-162-207-31	CERAMIC	22PF	5%	50V
C653	1-126-022-11	ELECT	47uF	20%	25V
C654	1-126-022-11	ELECT	47uF	20%	25V
C655	1-162-294-31	CERAMIC	0.001uF	10%	50V
C656	1-162-294-31	CERAMIC	0.001uF	10%	50V
C657	1-164-159-11	CERAMIC	0.1uF		50V
C658	1-164-159-11	CERAMIC	0.1uF		50V
		< CONNECTOR >			
CN651	1-564-723-11	PIN, CONNECTOR (SMALL TYPE) 7P			
		< IC >			
IC651	8-759-712-02	IC NJM2114D			
		< JACK >			
J651	1-770-904-11	JACK (LARGE TYPE)(PHONES)			
		< TRANSISTOR >			
Q651	8-729-231-55	TRANSISTOR 2SC2878-AB			
Q652	8-729-231-55	TRANSISTOR 2SC2878-AB			
Q653	8-729-231-55	TRANSISTOR 2SC2878-AB			
Q654	8-729-231-55	TRANSISTOR 2SC2878-AB			
		< RESISTOR >			
R651	1-259-460-11	CARBON	22K	5%	1/6W
R652	1-259-460-11	CARBON	22K	5%	1/6W
R653	1-259-444-11	CARBON	4.7K	5%	1/6W
R654	1-259-458-11	CARBON	18K	5%	1/6W
R655	1-259-444-11	CARBON	4.7K	5%	1/6W
R656	1-259-458-11	CARBON	18K	5%	1/6W
R657	1-259-406-11	CARBON	120	5%	1/6W
R658	1-259-406-11	CARBON	120	5%	1/6W
R659	1-259-444-11	CARBON	4.7K	5%	1/6W
R660	1-259-444-11	CARBON	4.7K	5%	1/6W
R661	1-259-444-11	CARBON	4.7K	5%	1/6W
R662	1-259-444-11	CARBON	4.7K	5%	1/6W

Ref. No.	Part No.	Description			Remark
		< VARIABLE RESISTOR >			
RV651	1-225-372-11	RES, VAR, CARBON 20K/20K (PHONE LEVEL)			
**********					
*	1-663-897-11	IN BOARD ********			
		< CONNECTOR >			
CN191	1-506-481-11	PIN, CONNECTOR 2P			
* CN192	1-568-941-11	PIN, CONNECTOR 3P			
		< SWITCH >			
SW191	1-571-300-21	SWITCH, ROTARY (LOAD IN DET)			
**********					
*	1-663-900-11	LMOT BOARD **********			
M191	X-4947-824-1	MOTOR (LOADING) ASSY			
**********					
*	1-663-898-11	OUT BOARD *********			
		< CONNECTOR >			
CN193	1-506-481-11	PIN, CONNECTOR 2P			
		< SWITCH >			
SW192	1-571-300-21	SWITCH, ROTARY (LOAD OUT DET)			
**********					
*	1-664-817-11	PJ BOARD ********			
		< CAPACITOR >			
C598	1-110-335-11	MYLAR	100PF	5% 50V	
C599	1-110-335-11	MYLAR	100PF	5% 50V	
		< CONNECTOR >			
* CN581	1-564-519-11	PLUG, CONNECTOR 4P			
		< JACK >			
PJ501	1-568-101-11	JACK, PIN 4P (LINE (ANALOG))			
		< RESISTOR >			
R591	1-249-528-91	CARBON	100	5% 1/4W	
R592	1-249-528-91	CARBON	100	5% 1/4W	
R593	1-249-528-91	CARBON	100	5% 1/4W	
R594	1-249-528-91	CARBON	100	5% 1/4W	
**********					

Ref. No.	Part No.	Description			Remark
*	A-4699-460-A	PSW BOARD, COMPLETE **********			
*	4-972-608-01	HOLDER (DIA. 5), LED			
	4-976-360-02	REINFORCEMENT (CONT)			
		< CAPACITOR >			
C711	1-162-294-31	CERAMIC	0.001uF	10% 50V	
C781	1-162-294-31	CERAMIC	0.001uF	10% 50V	
C782	1-164-159-11	CERAMIC	0.1uF	50V	
C783	1-164-159-11	CERAMIC	0.1uF	50V	
C784	1-126-154-11	ELECT	47uF	20% 6.3V	
C785	1-126-154-11	ELECT	47uF	20% 6.3V	
		< CONNECTOR >			
CN781	1-766-204-11	PLUG, CONNECTOR PIN 11P			
		< DIODE >			
D704	8-719-303-02	DIODE SEL2510C-D (FILTER)			
D781	8-719-313-40	DIODE SEL1516W (POWER)			
		< IC >			
IC781	8-759-332-18	IC GP1U27XB			
		< TRANSISTOR >			
Q704	8-729-661-94	TRANSISTOR RT1N141SK-TP			
Q781	8-729-422-57	TRANSISTOR UN4111			
		< RESISTOR >			
R706	1-259-452-11	CARBON	10K	5% 1/6W	
R707	1-259-452-11	CARBON	10K	5% 1/6W	
R708	1-259-452-11	CARBON	10K	5% 1/6W	
R716	1-259-452-11	CARBON	10K	5% 1/6W	
R717	1-259-464-11	CARBON	33K	5% 1/6W	
R718	1-259-452-11	CARBON	10K	5% 1/6W	
R719	1-259-444-11	CARBON	4.7K	5% 1/6W	
R720	1-259-440-11	CARBON	3.3K	5% 1/6W	
R721	1-259-436-11	CARBON	2.2K	5% 1/6W	
R722	1-259-452-11	CARBON	10K	5% 1/6W	
R738	1-259-416-11	CARBON	330	5% 1/6W	
R781	1-259-424-11	CARBON	680	5% 1/6W	
R782	1-259-452-11	CARBON	10K	5% 1/6W	
R783	1-259-452-11	CARBON	10K	5% 1/6W	
R784	1-259-412-11	CARBON	220	5% 1/6W	
R785	1-259-404-11	CARBON	100	5% 1/6W	
		< SWITCH >			
S701	1-762-878-11	SWITCH, ROTARY (INPUT)			
S709	1-554-303-21	SWITCH, TACTILE (PLAY MODE)			
S710	1-554-303-21	SWITCH, TACTILE (FILTER)			
S711	1-554-303-21	SWITCH, TACTILE (SCROLL/CLOCK SET)			
S712	1-554-303-21	SWITCH, TACTILE (REPEAT)			
S713	1-554-303-21	SWITCH, TACTILE (TIME)			
S714	1-554-303-21	SWITCH, TACTILE (DISPLAY/CHAR)			
S781	1-572-625-11	SWITCH, SLIDE (TIMER)			
S782	1-554-303-21	SWITCH, TACTILE (POWER)			
**********					

PW

Ref. No.	Part No.	Description			Remark
*	A-4699-455-A	PW BOARD, COMPLETE (US)			
		**********			
*	A-4699-591-A	PW BOARD, COMPLETE (AEP,UK,G)			
		**********			
*	3-309-144-21	HEAT SINK			
*	4-363-146-00	HEAT SINK, V.OUT			
*	4-921-402-01	HEAT SINK			
	7-685-646-79	SCREW +BVTP 3X8 TYPE2 N-S			
		< BATTERY >			
BT901	1-528-739-11	BATTERY, LITHIUM (VL2020 3V)			
		< CAPACITOR >			
C901	1-164-159-11	CERAMIC	0.1uF		50V
C902	1-126-963-11	ELECT	4.7uF	20%	50V
C903	1-164-159-11	CERAMIC	0.1uF		50V
C904	1-126-963-11	ELECT	4.7uF	20%	50V
C905	1-126-927-11	ELECT	2200uF	20%	10V
C906	1-164-159-11	CERAMIC	0.1uF		50V
C907	1-126-933-11	ELECT	100uF	20%	16V
C909	1-126-927-11	ELECT	2200uF	20%	10V
C911	1-126-960-11	ELECT	1uF	20%	50V
C912	1-164-159-11	CERAMIC	0.1uF		50V
C913	1-164-159-11	CERAMIC	0.1uF		50V
C914	1-126-936-11	ELECT	3300uF	20%	16V
C915	1-164-732-11	CERAMIC	0.1uF	20%	50V
C916	1-164-732-11	CERAMIC	0.1uF	20%	50V
C917	1-124-557-11	ELECT	1000uF	20%	25V
C918	1-117-149-21	ELECT	2200uF	20%	25V
C919	1-126-926-11	ELECT	1000uF	20%	10V
C920	1-164-732-11	CERAMIC	0.1uF	20%	50V
C922	1-164-732-11	CERAMIC	0.1uF	20%	50V
C923	1-164-159-11	CERAMIC	0.1uF		50V
C924	1-126-926-11	ELECT	1000uF	20%	10V
C926	1-164-159-11	CERAMIC	0.1uF		50V
C927	1-126-969-11	ELECT	220uF	20%	50V
C928	1-164-159-11	CERAMIC	0.1uF		50V
C929	1-117-401-11	ELECT	22000uF	20%	16V
C930	1-161-494-00	CERAMIC	0.022uF		25V
C932	1-110-504-11	ELECT	6800uF	20%	35V
C933	1-110-504-11	ELECT	6800uF	20%	35V
C934	1-164-159-11	CERAMIC	0.1uF		50V
C935	1-126-965-11	ELECT	22uF	20%	50V
C936	1-128-554-11	ELECT	330uF	20%	63V
C937	1-126-935-11	ELECT	470uF	20%	16V
C938	1-126-964-11	ELECT	10uF	20%	50V
C939	1-136-153-00	FILM	0.01uF	5%	50V
C940	1-136-153-00	FILM	0.01uF	5%	50V
C941	1-164-159-11	CERAMIC	0.1uF		50V
C942	1-164-159-11	CERAMIC	0.1uF		50V
C943	1-164-159-11	CERAMIC	0.1uF		50V
C944	1-164-159-11	CERAMIC	0.1uF		50V
		< CONNECTOR >			
CN901	1-580-460-11	SOCKET, CONNECTOR 26P			
CN903	1-564-511-11	PLUG, CONNECTOR 8P			
* CN904	1-564-507-11	PLUG, CONNECTOR 4P			
* CN905	1-564-704-11	PIN, CONNECTOR (SMALL TYPE) 2P			
		< DIODE >			
D901	8-719-987-63	DIODE 1N4148M			
D902	8-719-987-63	DIODE 1N4148M			
D903	8-719-987-63	DIODE 1N4148M			
D904	8-719-987-63	DIODE 1N4148M			
D905	8-719-200-82	DIODE 11ES2			
D907	8-719-210-21	DIODE 11EQS04			
D908	8-719-210-21	DIODE 11EQS04			
D909	8-719-210-29	DIODE F10P10Q			
D910	8-719-210-29	DIODE F10P10Q			
D911	8-719-210-29	DIODE F10P10Q			
D912	8-719-210-29	DIODE F10P10Q			
D913	8-719-014-96	DIODE UZP-7.5BC			
D914	8-719-987-63	DIODE 1N4148M			
D915	8-719-210-29	DIODE F10P10Q			
D916	8-719-210-29	DIODE F10P10Q			
D917	8-719-987-63	DIODE 1N4148M			
D918	8-719-200-77	DIODE 10E2N			
D919	8-719-200-77	DIODE 10E2N			
D920	8-719-200-77	DIODE 10E2N			
D921	8-719-200-77	DIODE 10E2N			
D922	8-719-200-77	DIODE 10E2N			
D923	8-719-987-63	DIODE 1N4148M			
D924	8-719-987-63	DIODE 1N4148M			
		< GROUND PLATE >			
* EP901	4-870-539-00	PLATE, GROUND			
* EP902	4-870-539-00	PLATE, GROUND			
		< FUSE >			
⚠F901	1-532-771-21	FUSE, MICRO (SECONDARY)(0.315A 125V)(US)			
⚠F902	1-532-783-21	FUSE, MICRO (SECONDARY)(5A 125V)(US)			
⚠F903	1-532-783-21	FUSE, MICRO (SECONDARY)(5A 125V)(US)			
⚠F904	1-576-071-11	FUSE, MICRO (SECONDARY)(6.3A 125V)(US)			
⚠F905	1-576-071-11	FUSE, MICRO (SECONDARY)(6.3A 125V)(US)			
⚠F906	1-532-777-21	FUSE, MICRO (SECONDARY)(1.25A 125V)(US)			
		< IC >			
IC901	8-759-327-15	IC M62005L			
IC902	8-759-061-65	IC LA5602			
IC903	8-759-604-45	IC M5F79M12			
IC904	8-759-604-39	IC M5F78M12			
IC905	8-759-513-71	IC PQ05RF21			
IC906	8-759-925-74	IC SN74HC04ANS			
IC907	8-759-513-71	IC PQ05RF21			
IC908	8-759-633-42	IC M5293L			
IC909	8-759-520-49	IC PQ30RV21			
		< IC LINK >			
⚠ICP901	1-532-834-21	LINK, IC (PRF 315)(0.315A)(AEP,UK,G)			
⚠ICP902	1-532-846-11	LINK, IC (PRF 5000)(5A)(AEP,UK,G)			
⚠ICP903	1-532-846-11	LINK, IC (PRF 5000)(5A)(AEP,UK,G)			
⚠ICP904	1-532-847-21	LINK, IC (PRF 6300)(6.3A)(AEP,UK,G)			
⚠ICP905	1-532-847-21	LINK, IC (PRF 6300)(6.3A)(AEP,UK,G)			
⚠ICP906	1-532-840-21	LINK, IC (PRF 1250)(1.25A)(AEP,UK,G)			

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description			Remark
		< TRANSISTOR >			
Q901	8-729-038-19	TRANSISTOR RT1P144S-TP			
Q902	8-729-038-19	TRANSISTOR RT1P144S-TP			
Q903	8-729-422-57	TRANSISTOR UN4111			
Q905	8-729-140-98	TRANSISTOR 2SD773-34			
		< RESISTOR >			
R901	1-259-452-11	CARBON	10K	5%	1/6W
R902	1-259-452-11	CARBON	10K	5%	1/6W
R903	1-259-404-11	CARBON	100	5%	1/6W
R904	1-215-404-00	METAL	200	1%	1/4W
R905	1-215-414-00	METAL	510	1%	1/4W
R906	1-259-428-11	CARBON	1K	5%	1/6W
R907	1-259-488-11	CARBON	330K	5%	1/6W
R908	1-259-404-11	CARBON	100	5%	1/6W
R909	1-259-468-11	CARBON	47K	5%	1/6W
R910	1-259-444-11	CARBON	4.7K	5%	1/6W
R911	1-259-460-91	CARBON	22K	5%	1/6W
R912	1-259-468-11	CARBON	47K	5%	1/6W
R913	1-259-428-11	CARBON	1K	5%	1/6W
R914	1-259-404-11	CARBON	100	5%	1/6W
R915	1-259-404-11	CARBON	100	5%	1/6W
R916	1-259-432-11	CARBON	1.5K	5%	1/6W
R917	1-259-416-11	CARBON	330	5%	1/6W
		< RELAY >			
RY901	1-515-925-11	RELAY (45MHz)			

****

		MISCELLANEOUS	
		**********	
54	1-782-216-11	WIRE (FLAT TYPE)(30 CORE)	
55	1-782-215-11	WIRE (FLAT TYPE)(18 CORE)	
56	1-777-738-11	WIRE (FLAT TYPE)(26 CORE)	
57	1-777-737-11	WIRE (FLAT TYPE)(16 CORE)	
58	1-777-735-11	WIRE (FLAT TYPE)(18 CORE)	
107	1-777-736-11	WIRE (FLAT TYPE)(26 CORE)	
⚠457	8-583-009-12	OPTICAL PICK-UP KMS-210A/J-N	
⚠CNP001	1-558-568-21	CORD, POWER (AEP,UK,G)	
⚠CNP001	1-559-583-21	CORD, POWER (US)	
FL701	1-517-620-11	INDICATOR TUBE, FLUORESCENT	
HR901	1-500-304-21	HEAD, OVER WRITE	
M101	A-4660-651-A	MOTOR ASSY (SLED)	
M102	A-4660-650-A	CHASSIS ASSY, BU (SPINDLE)	
M191	X-4947-824-1	MOTOR (LOADING) ASSY	
M192	X-4947-821-1	MOTOR ASSY, HEAD	
S102	1-762-148-11	SWITCH, PUSH (2 KEY)(PROTECT/REFLECT)	
⚠T001	1-431-178-11	TRANSFORMER, POWER (AEP,UK,G)	
⚠T001	1-431-180-11	TRANSFORMER, POWER (US)	
⚠T002	1-431-179-11	TRANSFORMER, POWER (AEP,UK,G)	
⚠T002	1-431-181-11	TRANSFORMER, POWER (US)	

****

Ref. No.	Part No.	Description	Remark
		ACCESSORIES & PACKING MATERIALS	
		**********	
	1-475-091-11	REMOTE COMMANDER (RM-D13M)	
	1-590-925-31	CORD, CONNECTION (AUDIO, 100cm)	
	3-859-239-11	MANUAL, INSTRUCTION (ENGLISH,FRENCH)	
	3-859-239-21	MANUAL, INSTRUCTION (SPANISH,GERMAN,ITALIAN)(AEP,UK,G)	
	3-859-239-31	MANUAL, INSTRUCTION (DUTCH,SWEDISH,PORTUGUESE)(AEP,UK,G)	
	4-983-537-01	COVER, BATTERY (for RM-D13M)	

****

		**********	
		HARDWARE LIST	
		**********	
#1	7-685-233-14	SCREW +KTP 2.6X6 TYPE2NON-SLIT (GOLD)	
#1	7-685-233-19	SCREW +KTP 2.6X6 TYPE2NON-SLIT (BLACK)	
#2	7-682-247-09	SCREW +K 3X6	
#3	7-682-565-09	SCREW +B 4X16	
#4	7-685-873-09	SCREW +BVTT 3X10 (S)	
#5	7-685-880-09	SCREW +BVTT 4X6 (S)	
#6	7-685-871-01	SCREW +BVTT 3X6 (S)	
#7	7-682-548-09	SCREW +B 3X8	
#8	7-621-770-67	SCREW +B 2.6X6	
#9	7-621-775-10	SCREW +B 2.6X4	
#10	7-627-553-48	SCREW,PRECISION +P 2X4	
#11	7-685-105-19	TPG +P 2X8, TYPE 2, NON-SLIT	
#12	7-627-852-48	PRECISION SCREW +P1.7X3.5TYPE3	
#13	7-627-852-28	+P 1.7X3	
#14	7-685-871-09	SCREW +BVTT 3X6 (S)	
#15	7-685-533-19	SCREW +BTP 2.6X6 TYPE2 N-S	
#16	7-685-645-79	SCREW +BVTP 3X6 TYPE2 N-S	
#17	7-685-646-79	SCREW +BVTP 3X8 TYPE2 N-S	
#18	7-685-133-19	SCREW +P 2.6X6 TYPE2	
#19	7-627-553-38	SCREW,PRECISION +P 2X3	
#20	7-621-255-25	SCREW +P 2X4	
#21	7-685-103-19	SCREW +P 2X5 TYPE2 NON-SLIT	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

9-960-837-11

Sony Corporation
Home A&V Products Company

97B0973-1
Printed in Japan © 1997. 2
Published by Service and Safety Engineering Dept. (Shibaura)